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Tables, charts and graphs should be finalized carefully before sending. They should be clearly and accurately captioned and inked to size and their places designated in the manuscript.

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ABBREVIATIONS

In the name of journals cited in references and bibliographies, prepositions and conjunctions have been generally avoided, and the following abbreviations have been used:

Abnorm.	Abnormal
Amer.	American
App.	Applied
Br.	British
Bull.	Bulletin
Canad.	Canadian
Charac.	Character
Clin.	Clinical
Consult.	Consulting Consultation
Edu.	Education
Educl.	Educational
Engg.	Engineering
Exp.	Experimental
Guid.	Guidance
Ind.	Indian
Measmt.	Measurement
Med.	Medical
Monog.	Monograph(s)
Occup.	Occupational
Pers.	Personality
Personn.	Personnel
Psychol.	Psychology Psychological
Rep.	Report(s)
Res.	Research
Rev.	Review
Sec.	Secondary
Soc.	Social
Sociol.	Sociological
Statist.	Statistical
Stud.	Studies
Univ.	University

A Survey of Mathematics Achievement in Indian Schools[1]

S. S. Kulkarni
C. A. S. Naidu
Mohan Lal Arya

This paper describes the first mathematics achievement survey made in India. This survey was conducted on a representative sample of schools taken from all over the country. The tools used were two equivalent forms of achievement tests in mathematics, constructed for the three levels of schooling, i.e., primary, middle and high, and translated into different Indian languages. The results point out the weaknesses in present-day mathematics teaching and the subject areas in which the students find particular difficulty and in which remedial instruction is needed. The investigators have gone into the relationship between mathematics achievement and some variables like socio-economic conditions, type of school management, urbanization, attitudes of students, etc. The paper also brings into focus the similarities and differences between the findings of this survey and those of UNESCO's International Education Achievement Survey of 1963.

Before formulating any educational strategy, an educational planner at national or State level would like to know answers to questions like: Which geographical regions and/or school systems are weak and in what respect? Which educational objectives are fulfilled and to what extent? And so on.

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[1] This paper is based on a project conducted by the National Institute of Education under a contract with the Office of Education of the U.S. Government, Department of Health, Education and Welfare. The project team consisted of Shib. K. Mitra (Project Director), S S. Kulkarni (Principal Investigator), Mohan Lal, D. C. Upreti, (Miss) H. Nanda, R. N. Verma, Surinder Mohan, C. A. S. Naidu, K. R. Prasad, S. C. Gupta, Bharad Kant and Satvir Singh.

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Surveys of the existing strengths and weaknesses in the dimensions of content and objectives tell us where to put the available resources for remedial measures so as to get optimal results. It is desirable, therefore, to periodically conduct such educational surveys at different levels and in different subjects.

At the school level the diagnostic features of such an enquiry would be more intensive. Further, the unit of observation could be an individual student. Thus a teacher would come to know in detail the difficulties a given student faces, and/or whether a certain student has mastered all that he is expected to, and whether he could be given enriched or remedial material.

THE MATHEMATICS ACHIEVEMENT SURVEY

In India, the first step towards such an educational inquiry has been the Mathematics Achievement Survey being reported in this paper. This Survey was conducted at three levels of education—primary, middle and high school—in all the States of India, except Bihar and Madras and Delhi.

The States/groups of schools participating in the Survey and the regional languages used are given in Table 1 (page 3). The classes to which the tests were administered are also given in the same table.

THE TOOLS

This being an all-India survey, it was desirable to have tests measuring the same mathematics objectives throughout the country. It was also necessary to have equivalent versions of these tests in all the regional languages which are media of instruction in the various States.

The first major task in preparing these tests was, of course, to decide *what* content and objectives of mathematics these tests should reflect. Should they be tied down to textbooks prescribed and teaching methods used in the various States? Should they cover all the syllabi or only the syllabi that are commonly followed in the various States? Should these tests reflect only the present practices, good or bad, or could they include goals of mathematics education which are considered desirable by mathematicians and educationists irrespective of their inclusion or exclusion in some State syllabi? To decide these and other related issues likely to arise at subsequent stages of the project, a National Advisory Committee was constituted. This Committee consisted of nominees of the State governments, university professors of mathematics and the staff of N.I.E.

After examining the existing State syllabi in mathematics at all the three levels, the Committee, at its first meeting, decided that the tests should not be rigidly tied down to the past but should be forward-looking. It noted that various States are planning to change the curriculum to suit the new demands of mathematics education. At the same time it felt that the tests should not be so forward-looking as to reflect syllabi not being currently followed in any State. It was therefore decided to chop out the dead wood and to introduce only some of the new topics—which might not have been included in the syllabi of all the States but which are considered to be important by mathematicians.

TABLE 1

States and groups of schools participating in the Survey, the regional languages and the classes to which the tests were administered

SL. NO.	STATE/GROUP	LEVEL Primary	Middle	High	LANGUAGE(S)
1.	Andhra Pradesh ..	VI b	IX b	XI f	Telugu
2.	Assam ..	VI b	IX f	XI b and X f	Assamese
3.	Delhi ..	V f	VIII f	X f	Hindi
4.	Gujarat ..	VI b	IX b	XI f	Gujarati
5.	Jammu and Kashmir	VI b	IX b	X f	Urdu, Hindi and English
6.	Kerala ..	VI b	IX b	2nd year Pre-Degree b	Malayalam and English
7.	Madhya Pradesh ..	VI b	IX b	X f	Hindi
8.	Maharashtra .	VI b	IX b	XI f	Marathi
9.	Mysore ..	VI b	IX b	X f	Kannada
10.	Orissa ..	VI b	IX b	XI f	Oriya
11.	Punjab .	VI b	IX b	X f	Punjabi
12.	Haryana ..	VI b	IX b	X f	Hindi
13.	Rajasthan	VI b	IX b	X f	Hindi
14.	Uttar Pradesh ..	VI b	IX b	X f	Hindi
15.	West Bengal .	VI b	IX b	XI b and X f	Bengali
16.	Central Schools ..	VI b	IX b	X f	English and Hindi
17.	Public Schools ..	V f	VIII f	X f	English

b : The tests were administered to the beginners of the class.
f : The tests were administered to the finishers of the class.

With this orientation, the Committee finalized the Tables of Specifications for all the levels. These tables provided guidelines about the weightage to be given to different content areas and about the objectives of mathematics education. The Committee also felt that adequate importance should be given to the higher cognitive objectives like application, logical reasoning, and so on, and to the integration of the knowledge arising out of different branches of mathematics, *i.e.,* arithmetic, algebra and geometry.

Teachers of mathematics, from universities, colleges and schools from different States were then invited to write *objective-type* test items. These items were then edited and reviewed in order to bring them up to the desired level of difficulty. Care was also taken to re-cast them so that no one item would require more than two minutes to solve for a student who understands the basic principle underlying it. A large pool of items was thus developed to cover the content and objectives specified by the National Advisory Committee. This pool was distributed in four forms at each level for the purposes of try-out. The total number of items in the try-out tests was almost twice the number of items finally required for the proposed two equivalent forms.

The forms were translated into all the Indian languages (see Table 1) which are used as the medium of instruction. The translations were evaluated by various teachers/experts who were drawn from different regions of a State and were well versed with the language spoken in those different regions. These evaluations were mostly to ensure the appropriateness of the language and the life situations used in the application-type items in the tests.

Try-out of the tools

The drafts were subsequently tried out on about 1,600 students at each level in each State.

The try-out sample was chosen on a purposive basis so as to ensure the inclusion of students from the important strata like urban and rural, and regions in a given State where different dialects of the same language are spoken.

The tests were designed for survey purposes and hence were prepared on a mastery-test model or a criterion-referenced model. It was thus anticipated that the tests might prove to be very difficult, and hence not discriminating, if administered only to that class, the curriculum of which the test reflected. In order to overcome this difficulty the try-out sample also included a certain percentage of higher class students. That is to say, the Primary-level test was given to fifth or sixth class students and the Middle-level to both eighth and ninth class students and the High School-level test to both tenth and eleventh class students (Pre-University Year).

On the basis of the Item Analysis of the try-out data, two equivalent forms for each level were finally prepared. Each form of the Primary-level, Middle-level and High School-level tests had 50, 70 and 80 questions respectively. The split-up of these items over different content areas/objectives is given in Tables 2, 3 and 4 for Primary, Middle and High School levels respectively.

In addition to these tests, a booklet entitled "Directions and Questions for Practice" was also developed for each level. It explained to students how to record their answers to multiple-choice items and gave questions for practice to familiarize them with different multiple-choice item formats.

TABLE 2

Number of items in different cells of Table of Specification for Primary level tests

Sl. No.	Objectives	Knowledge		Skill		Application		Logical Reasoning and Interpretation of Data	
	Content Area	PI	PII	PI	PII	PI	PII	PI	PII
1.	Numeration and Four Fundamental Operations	1	1	3	3	1	1	3	3
2.	Units ..	1	..	..	..	7	7	..	1
3.	Fractions and Decimals	1	1	4	4	4	3	1	2
4.	Factors and Products	2	2	1	1	..	..	..	..
5.	Family Budget ..	..	..	..	..	1	1	1	1
6.	Simple Proportion ..	..	..	..	..	1	1	2	2
7.	Percentage and Simple Interest	..	..	..	..	5	5	1	1
8.	Profit and Loss ..	..	..	..	..	1	1	2	2
9.	Estimation ..	..	..	..	..	..	..	1*	1*
10.	Geometry ..	1	1	..	..	1	1	3	3
11.	Integrated Problems ..	..	..	..	..	..	..	2*	2*
	Total ..	6	5	8	8	21	20	16	18

* This total includes some items which are classified under two topics.

Reliability

The reliability of the tests was studied by the internal consistency procedure (K.R.-21 formula). These coefficients are above 80 for most of the States. At the High School level they increase up to ninety-eight. They do however go down to ·50 in a few cases where the performance of the State is very poor—below the guess score. It could be inferred from these data that the tests are reliable for the population surveyed.

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TABLE 3

Number of items in different cells in Table of Specifications for Middle level

SL. No.	OBJECTIVE/CONTENT (TOPICS)	KNOLWEDGE (I)		SKILL (II)		APPLICATION (III)		LOGICAL REASONIN AND INTERPRETATION OF DATA (IV)	
		MI	MII	MI	MII	MI	MII	MI	MII
1.	Numbers	2	2	4	5	..	..	2	1
2.	Average	..	..		..	2	2	.	..
3.	Percentage, Profit and Loss	..	..	..	..	3	3	1	1
4.	Simple and Compound Interest	1	1	..	..	1	2	1	..
5.	Ratio and Proportion	..	.	..	..	4	4	..	..
6.	Speed	..	..	..	..	2	2	..	..
7.	Area and Volume	..	..	..	..	4	4	..	..
8.	Graphs of Statistics	..	..	2	2	..	..	..	..
9.	Symbolic Representation	2	2	..	1	1	2	3	1
10.	Four Fundamental Operations	..	..	4	5	1	..	..	..
11.	Laws and Assumption	..	..	..	..	2	2	2	2
12.	Simple Equations and Problems	..	..	..	..	2	2	2	2
13.	Simultaneous Equations and Problems	.	..	..	..	..	..	1	1
14.	Formulae	..	..	..	..	1	1	..	..
15.	Graphs	..	..	3	3	..	..	..	..
16.	Solids	1	1	..	..	..	..	..	..
17.	Lines	2	1	..	..	..	..	1	1
18.	Angles	1	2	..	..	..	..	1	..
19.	Properties of Triangles, Quadilaterals	..	1	..	..	4	..	3	6
20.	Integrated Problems	..	..	3	3	2	1	2	2
	Total	9	10	16	19	29	25	19	17

Note: Some items were put under more than one topic.

TABLE 4

Number of items in different cells of Table of Specifications for High School level

Sl. No.	Objective/Content (Topics)	Knowledge (I)		Skill (II)		Application (III)		Logical Reasoning and Interpretation of Data (IV)	
		HI	HII	HI	HII	HI	HII	HI	HII
1.	Square Root and Cube Root	1	1	1	1	..	..	1	..
2.	Ratio and Proportion	..	1	..	..	4	3	..	..
3.	Interest, Present Worth and Discount, Stocks and Shares	2	3	..	..	3	3	1	..
4.	Area and Volume	..	..	..	..	4	4	..	..
5.	Algebraic Laws and Four Foundamental Operations	..	1	4	3	..	..	1	2
6.	Products and Factors	..	.	3	3	..	..	..	..
7.	Function	2	1	..	..	..	..	..	..
8.	Simple Equation, Simultaneous Equation and Problems	..	1	1	1	4	4	..	..
9	Graphs	..	1	1	1	1	..	..	..
10.	Quadratic Equation	1	1	1	2	1	..	..	..
11.	Ratio and Proportion	1	1	..	..	..	..	..	..
12.	Elimination	..	..	2	2	..	..	..	..
13	Surds	2	..	..	2	..	..	..	..
14,	A.P. and C.P.	..	..	..	.	1	1	1	1
15.	Logarithm	2	1	1	1	..	..	..	1
16.	Angles at a Point	1	1	..	..	1	..	..	1
17.	Parallel Line	..	..	..	..	2	2	..	..
18.	Triangles and Their Properties	1	..	..	..	3	2	4	7
19.	Polygon and Parallelogram	1	..	..	..	1	2	..	..
20.	Areas	..	..	..	..	1	2	1	..
21.	Loci	1	1	..	..	..	..	..	..
22	Circles and Tangents	..	1	..	..	..	..	2	..
23.	Trigonometry	2	2	2	1	1	..	..	..
24.	Integrated Problems	..	..	2	1	6	7	2	2
	Total	17	17	18	18	33	30	13	15

Another aspect of the reliability of a test is the standard error of measurement. In the interpretation of the performance of an individual pupil, this index provides a useful yardstick of the dependability of the reported score. In most cases, the standard error of measurement in these tests is lower than three.

Validity

The validity of an achievement test is measured by content validation. This implies experts' evaluation regarding whether the test reflects the objectives

TABLE 5

Sample size N and Mean Score (in percentage) in different States and at different levels

			PRIMARY LEVEL		MIDDLE LEVEL		HIGH LEVEL	
SL. No.	*States*		*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
1	2		3	4	5	6	7	8
				%		%		%
1.	Andhra Pradesh	Form 1	2135	26	513	18	696	23
		Form 2	2136	26	516	18	723	24
2.	Assam	Form 1	212	41	176	22	403	22
		Form 2	205	47	176	24	386	23
3.	Delhi	Form 1	550	48	564	25	422	30
		Form 2	589	48	557	26	436	30
4.	Gujarat	Form 1	1912	42	482	25	338	31
		Form 2	1893	40	471	24	330	30
5.	Jammu and Kashmir	Form 1	45	33	45	20	..	..
	(Hindi)	Form 2	45	33	45	20	...	..
	(Urdu)	Form 1	112	28	91	18	217	23
		Form 2	109	29	89	17	218	23
6.	Kerala	Form 1	1531	43	306	24	711	37
		Form 2	1530	41	314	23	684	37
7.	Madhya Pradesh	Form 1	915	36	656	22	1497	24
		Form 2	911	33	637	21	1399	25
8.	Maharashtra	Form 1	1233	40	3084	25	1037	32
		Form 2	1234	41	3074	24	994	31
9.	Mysore	Form 1	2186	38	682	24	1208	23
		Form 2	2185	37	657	23	1200	23
10.	Orissa	Form 1	435	44	1421	28	957	33
		Form 2	438	42	1395	27	953	34
11.	Punjab	Form 1	314	34	315	25	617	24
		Form 2	316	34	314	23	619	26
12.	Haryana	Form 1	134	37	140	24	200	26
		Form 2	134	35	140	23	195	28
13.	Rajasthan	Form 1	388	34	1658	24	353	22
		Form 2	393	33	1652	23	347	24
14.	Uttar Pradesh	Form 1	1483	36	619	23	444	22
		Form 2	1483	35	621	24	429	24
15.	West Bengal	Form 1	219	46	305	30	508	33
		Form 2	221	42	270	29	484	33
16.	Central Schools							
	(English)	Form 1	173	46	205	27	301	25
		Form 2	159	44	168	27	347	27
	(Hindi)	Form 1	137	36	79	21	111	21
		Form 2	135	35	68	22	115	23
17.	Public Schools	Form 1	70	51	80	40	82	39
		Form 2	75	50	80	38	77	40

and content areas and the weightage given to them in the specification table. The National Advisory Committee, in their second meeting, screened each of the items and selected them for the final tests from the point of view of this validation. In addition to this, four other experts reviewed these tests independently for the same purpose. The assessment by all these persons suggests that the tests reflect the goals laid down for the tests, and hence they are highly valid.

THE SAMPLE

The sampling unit for the survey purpose was a school. About 1,500 schools at each level were selected from all over India (except Bihar and Madras) for administering these final tests. This number was distributed over different States on the basis of the total number of schools in a State (as per the 1961 Census).

Within each State, the sample was further stratified into regions based on cultural/linguistic homogeneity, sectors (urban and rural), sex (boys and girls), type of management (Government and non-Government).

In each school, about 20 to 40 students were tested, half on one form of the test and the remaining half on the other, equivalent form. Before the testing started, the booklet "Directions and Questions for Practice" was thoroughly discussed with the students to enable them to understand the type of the examination they were going to take and the way to answer the questions.

Out of the 15 States surveyed, ten were stratified into regions. These may be seen in Table 6. The proportion of schools allotted to these regions was decided on the basis of the total number of schools in these regions, or (where this information was not available) on the basis of the number of districts in each region.

The stratification on the urban-rural dimension was done in three categories: (i) big cities with a population each of 10 lakhs and above, (ii) towns with a population each of 5,000 to 10 lakhs; and (iii) rural areas comprising blocks/tehsils.

The allocation to these categories was done as follows:

Out of the total number of schools allotted to a State, 50 per cent schools were allotted to rural areas and 50 per cent to urban areas; of the latter, about 30 schools were allotted to a big city if one existed in that State. The allotment of schools as regards boys' and girls' schools (wherein 'boys' schools' included co-educational schools) and as regards the type of management was determined on the basis of the approximate figures available about their proportion in the State.

As expected, all the schools selected in the sample did not participate in the Survey In some cases substitutes were selected as per the design. But quite often this could not be done, as in the case of U.P. where the generally disturbed socio-political conditions affected most of selected schools or schools otherwise in the sample.

TABLE

Sample sizes, means and standard deviations for the

STATE/GROUP	LEVEL AND FORM	TOTAL GROUP			REGION I			REGION II		
		n	*m*	*s.d.*	*n*	*m*	*s.d.*	*n*	*m*	*s.d.*
1	2	3	4	5	6	7	8	9	10	11
					Telangana			Rayalaseema		
1. Andhra Pradesh	PI	2135	13·6	7·0	707	9·8	4·1	834	15·8	7·2
	PII	2136	13·1	6·2	707	9·8	3·7	842	15·0	6·5
	MI	513	12·6	5·0	141	11·0	4·1	223	13·0	5·1
	MII	516	12·6	4·6	140	11·2	4·4	225	13·0	4·3
	HI	696	18·1	7·3	199	17·7	9·2	371	18·1	6·4
	HII	723	19·3	7·7	236	20·0	9·7	360	18·9	6·2
					Kutch			Saurashtra		
2. Gujarat	PI	1812	21·5	8·5	79	21·7	6·1	358	21·8	8·9
	PII	1893	20·0	7·8	79	21·1	6·0	361	20·9	8·2
	MI	482	17·2	7·3	20	17·6	6·7	100	16·5	6·7
	MII	471	17·0	5·8	20	17·6	6·7	97	16·4	5·7
	HI	338	24·8	10·4	15	30·6	10·1	70	20·8	9·4
	HII	330	23·7	9·4	15	25·3	6·4	68	23·0	10·4
					Urdu			Hindi		
3. Jammu and Kashmir*	PI	157	14·7	6·0	112	14·0	5·4	45	16·4	7·2
	PII	155	15·2	0·6	110	14·7	6·2	45	16·3	6·2
	MI	136	13·1	6·8	91	12·5	7·5	45	14·2	5·1
	MII	134	12·9	6·6	89	12·2	7·0	45	14·1	5·3
	HI	217	18·1	5·7	..	..	..	..	..	..
	HII	218	18·5	5·1	..	..	..	..	..	..
					Southern			Central		
4. Kerala	PI	1531	21·4	6·7	674	19·8	6·5	595	22·7	6·6
	PII	1530	20·7	6·0	672	19·3	5·9	594	22·1	6·0
	MI	306	16·5	6·2	131	14·8	6·1	114	17·7	5·9
	MII	314	17·0	6·1	129	15·9	6·3	125	17·4	5·8
	HI	711	29·5	9·5	290	28·2	9·0	225	30·6	9·9
	HII	684	29·2	8·8	285	27·1	7·9	204	29·1	8·6
					Gwalior			Indore		
5. Madhya Pradesh	PI	915	17·3	8·3	231	14·3	8·5	170	16·7	6·6
	PII	941	15·7	7·4	232	11·7	6·5	170	14·8	5·8
	MI	656	15·1	7·4	79	13·4	5·7	130	14·6	7·9
	MII	637	14·6	6·3	81	14·9	6·3	130	14·0	5·1
	HI	1497	18·2	7·0	241	18·8	7·2	321	16·9	6·2
	HII	1399	19·8	8·5	238	20·3	7·4	313	18·5	7·2

6

States surveyed and for regions within States

REGION III			REGION IV			REGION V			REGION VI		
n	*m*	*s.d.*	*n*	*m*	*s.d.*	*n*	*m*	*s.d.*	*n*	*m*	*s.d.*
12	13	14	15	16	17	18	19	20	21	22	23
Circars											
594	14·9	7·5	..	..	..	..	..	..	..	..	..
594	14·2	6·6	..	..	..	..	..	..	..	..	..
149	13·4	5·5	..	..	..	..	..	..	..	..	..
151	13·2	4·8	..	..	..	..	..	..	..	..	..
126	18·6	6·5	..	..	..	..	..	..	..	..	..
127	19·3	6·8	..	..	..	..	..	..	..	..	..
Sabarkantha			Ahmedabad			Baroda					
444	20·4	8·5	621	19·9	7·0	410	23·0	9·5	..	..	..
447	20·1	8·2	625	18·8	6·3	381	20·7	8·9	..	..	..
107	18·7	9·0	154	17·6	7·2	101	16·7	8·1	..	..	..
100	18·2	6·6	155	16·5	6·7	99	16·5	5·2	..	..	..
77	28·3	11·4	98	24·6	8·9	78	24·3	10·1	..	..	..
68	25·4	7·8	99	24·4	9·4	80	24·3	9·0	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
Northern											
262	22·4	6·0	..	..	..	..	..	..	..	..	..
260	21·4	5·7	..	..	..	..	..	..	..	..	..
61	17·9	6·4	..	..	..	..	..	..	..	..	..
60	18·5	5·4	..	..	..	..	..	..	..	..	..
196	30·1	9·3	..	..	..	..	..	..	..	..	..
195	32·4	9·5	..	..	..	..	..	..	..	..	..
Bhopal			Mahakoshal			Chattisgarh			Rewa		
58	17·0	5·3	217	20·4	9·5	109	18·8	7·1	130	16·9	7·9
62	13·9	6·2	214	19·7	7·9	107	17·4	6·5	126	17·0	7·1
50	15·0	7·9	175	16·3	7·9	85	17·2	8·6	137	13·6	7·0
50	14·4	5·6	165	15·1	6·8	85	15·6	8·6	126	13·9	5·0
81	17·9	5·5	312	18·0	7·8	240	18·9	6·8	302	13·8	7·3
84	20·5	6·4	271	19·4	8·2	201	20·1	7·1	292	21·0	11·6

TABLE

STATE/GROUP		LEVEL AND FORM	TOTAL GROUP			REGION I			REGION II		
			n	*m*	*s.d.*	*n*	*m*	*s.d.*	*n*	*m*	*s.d.*
1		2	3	4	5	6	7	8	9	10	11
							Maratwada			West Mhr.	
6.	Maharashtra	PI	1233	20·0	8·0	226	16·7	7·8	381	22·5	7·6
		PII	1234	20·3	7·9	223	17·6	8·4	380	22·1	7·8
		MI	3086	17·4	8·2	489	13·3	5·6	745	19·3	7·6
		MII	3074	16·5	7·8	462	12·7	5·2	733	17·8	8·7
		HI	1037	25·3	12·3	68	17·0	8·3	214	27·2	14·1
		HII	994	24·8	11·0	66	19·2	8·7	182	27·5	12·1
							Bangalore			Hassan	
7.	Mysore	PI	2186	19·0	0·3	919	17·2	7·9	334	17·8	6·6
		PII	2185	18·6	9·0	917	16·5	7·9	331	18·4	7·3
		MI	682	16·7	8·2	321	15·5	7·3	85	14·6	7·7
		MII	657	15·9	8·5	..	14·5	6·7	85	14·2	7·8
		HI	1208	16·2	6·2	633	14·6	4·8	110	16·1	5·2
		HII	1200	18·9	7·2	615	16·7	5·1	110	18·0	5·4
							Cuttack			Babsore	
8.	Orissa	PI	435	22·1	7·9	170	23·0	8·5	120	22·6	7·3
		PII	438	21·2	7·7	169	22·8	8·8	115	21·2	6·8
		MI	1421	19·9	9·0	514	21·1	9·7	453	20·5	8·1
		MII	1394	18·8	8·8	498	19·9	9·9	448	19·8	8·4
		HI	957	26·7	11·0	379	27·7	11·3	273	25·2	9·8
		HII	953	26·9	10·7	368	28·1	10·5	271	26·9	10·7
							Ajmer			Jodhpur	
9.	Rajasthan	PI	388	16·9	6·1	119	18·8	4·2	45	19·9	7·6
		PII	393	16·4	7·6	120	18·4	8·1	49	17·9	10·7
		MI	1658	17·2	8·7	454	17·4	9·8	214	18·1	7·0
		MII	1652	16·1	6·7	443	16·0	7·0	259	16·6	7·2
		HI	353	19·9	7·6	100	18·4	6·4	55	19·9	7·0
		HII	347	20·5	6·8	100	19·5	6·4	56	24·2	8·4
							Northern			Western	
10.	Uttar Pradesh	PI	1483	18·0	8·3	211	17·9	6·2	476	18·8	9·1
		PII	1483	17·5	8·0	211	16·6	6·9	479	18·2	8·7
		MI	619	16·4	7·8	70	13·8	8·7	225	16·5	7·0
		MII	621	17·0	7·9	70	14·5	5·2	225	16·5	6·9
		HI	444	17·6	8·6	50	15·7	4·9	143	18·6	8·9
		HII	429	19·4	8·6	49	16·7	4·9	137	20·5	9·4

PI, MI, HI refer to Form I at Primary, Middle and High School
Middle and High School levels respectively.

* In Jammu and Kashmir State, Hindi tests in Jammu region and
while English tests were administered at High School level.

A SURVEY OF MATHEMATICS ACHIEVEMENT IN INDIAN SCHOOLS

REGION V REGION VI

The number of schools which ultimately participated and the percentage and effect of non-response is given in Table 7.

TABLE 7

Response position of schools in States

SL. NO.	STATE	LEVEL	NO. OF SCHOOLS PARTICIPATING IN THE SURVEY	NON-RESPONSE IN PERCENTAGE	REMARKS
1	2	3	4	5	6
1.	Andhra Pradesh	P	108	40	More non-response in Telengana region; Urban and non-Government Schools
		M	103	43	More non-response in Telengana and Circars regions, Urban and Non-Government Schools
		H	60	59	More non-response in Telengana and Circars regions
2.	Assam	P	40	33	Equally spread over the variables
		M	34	43	Equally spread over the variables
		H	29	38	More in Urban and Government Schools
3.	Delhi	P	24	40	More non-response in rural area
		M	32	30	Equally spread over the variables
		H	25	22	Equally spread over the variables
4.	Gujarat	P	92	17	Equally spread over the variables
		M	93	5	Equally spread over the variables
		H	66	28	More in the Ahmedabad City
5.	Jammu and Kashmir	P	30	3	Equally spread over the variables
		M	27	10	Equally spread over the variables
		H	12	0	..
6.	Kerala	P	62	5	Equally spread over the variables
		M	62	3	Equally spread over the variables
		H	24	20	More non-response in Central regions and Government Schools
7.	Madhya Pradesh	P	131	13	More non-response in Rewa region
		M	129	14	Equally spread over the variables
		H	105	30	More non-response in Bhopal and Mahakosal regions
8.	Maharashtra	P	190	5	More non-response in Western Maharashtra region
		M	172	18	More non-response in Bombay City
		H	136	28	More non response in Western Maharashtra region
9.	Mysore	P	127	17	More non-response in Bangalore and Mangalore regions
		M	134	10	Equally spread over the variables
		H	104	31	More non-response in Bangalore City and Dharwar region
10.	Orissa	P	85	11	Equally spread over the variables
		M	85	10	More non-response in Cuttack region and non-Government Schools
		H	88	4	More non-response in non-Government Schools

TABLE 7—*Contd.*

1	2	3	4	5	6
11.	Punjab	P	61	24	More non-response in urban schools and non-Government Schools
		M	61	24	More non-response in non-Government Schools
		H	40	50	More non response in urban schools and non-Government Schools
12.	Haryana	P	30	9	Equally spread over the variables
		M	26	21	More non-response in urban schools and non-Government Schools
		H	14	58	More non-response in non-Government Schools
13	Rajasthan	P	90	12	Equally spread over the variables
		M	92	9	Equally spread over the variables
		H	70	31	More non-response in Bikaner region, rural schools and non-Government Schools
14.	Uttar Pradesh	P	133	26	More non-response in urban Schools and non-Government Schools
		M	125	42	More non-response in non-Government Schools
		H	79	58	More non-response in urban schools and non-Government Schools
15.	West Bengal	P	45	68	More non-response in districts other than Calcutta and non-Government Schools
		M	58	59	Equally spread over the variables
		H	35	75	Equally spread over the variables
16.	Central Schools	P	46	17	..
		M	48	17	..
		H	41	29	..
17.	Public Schools	P	15	54	More non-response from Public Schools other than Sainik Schools
		M	16	52	More non-response from Public Schools other than Sainik Schools
		H	16	49	More non-response from Public Schools other than Sainik Schools

In addition to the schools selected from 15 States, some other schools were also selected from two special categories of schools: (i) schools run by the Central Schools Organization, sponsored by the Union Ministry of Education, and (ii) the Public and Sainik Schools affiliated to the Council for the Indian School Certificate Examinations.

The final analysis was carried out on full data only for a few States. For other States, to save time and money, sub-sampling was resorted to by randomly selecting five answer scripts from each class in each school for each form of the test. The effect of sub-sampling was studied in the case of the data from Kerala State. It was found that the differences between the school means computed on the total sample and on the sub-sample were not significant over the schools.

It was observed that the sample was adequately representative for the Survey results to throw light on the various questions mentioned above which are faced by teachers and educational planners.

RESULTS

Results at national level

This being the first survey, we shall not be able to say whether standards in India are going down, because we do not have objective evidence of the past to compare with. However, on the basis of these results one may say that our national performance is quite below the desired level Table 5 gives the students' sample size and the means, expressed in percentages, for different States at the Primary, Middle and High levels. It may be noted here that the Primary-level tests were actually administered to sixth class beginners; the Middle-level tests to ninth class beginners and High School tests to the finishers of the matriculation or equivalent class in most of the States. In other words, at the Primary and Middle levels, tests were given to students who were expected to be little above the level for which the tests were prepared. In spite of this, the performance is rather poor.

Tables 8, 9 and 10 give the different content areas for the Primary, Middle and High School levels and the number of States having a certain average difficulty value (percentage of students responding correctly) for the content area.

TABLE 8

Number of States at different difficulty levels for topics at Primary level

Sl. No.	Topic	DIFFICULTY LEVEL 10–19	20–29	30–39	40–49	50–59	60–69	70–79
1.	Numeration and Four Fundamental Operations	..	2	1	7	7	4	..
2.	Units ..	.	2	9	6	2		
3.	Fractions and Decimals	..	2	13	4	..	..	..
4.	Factors and Products	..	1	4	8	5	..	1
5.	Family Budget	1	1	9	4	2	2	...
6.	Simple Proportion	1	4	9	4	1	..	..
7.	Percentage and Simple Interest	15	4	—	...	..	...	...
8.	Profit and Loss	1	5	13	.	..	..	...
9.	Estimation	..	1	4	7	3	4	..
10.	Geometry	1	1	5	5	5	2	..
11.	Integrated Problems	1	7	9	2	..	...	..

TABLE 9

Number of States at different difficulty levels for topics at Middle level

Sl. No.	Topic	Difficulty Level						
		0–9	10–19	20–29	30–39	40–49	50–59	60–69
1.	Number	..	9	9	1	..	..	..
2.	Average	..	15	4	..	..	..	..
3.	Percentage of Profit and Loss	1	16	2	..	..	..	..
4.	Simple and Compound Interest	..	3	7	6	3	..	..
5.	Ratio and Proportion	..	4	11	3	1	..	..
6.	Speed	1	14	3	1	..	...	—
7.	Average and Value	..	17	2	..	...	..	—
8.	Graphs of Statistics	...	9	9	—	..	..	—
9.	Symbolic Representative	1	1	9	8	..	—	.
10.	Four Fundamental operations	—	3	10	4	1	1	.
11.	Law and Assumptions	..	1	18	—	...	—	.
12.	Simple Equations and Problems	..	15	3	1	—	—	...
13.	Simultaneous Equations	8	8	3	—	—	...	..
14.	Formulae	...	15	4	—	—	—	—
15.	Graphs	1	17	1	—	—	—	...
16.	Solids	1	1	8	5	2	2	...
17.	Lines	...	1	1	7	8	1	1
18.	Angles	..	2	10	3	3	1	—
19.	Triangles, Quadrilaterals and Circles	..	1	16	2	—	—	—
20.	Intergrated Problems	..	8	11	—	—	—	—

TABLE 10

Number of States at different difficulty levels for topics at High School level

Sl. No.	Topic	Difficulty Level 0–9	10–19	20–29	30–39	40–49	50–59	60–69
1.	Square Root and Cube Root		..	4	6	7	..	1
2.	Ratio and Proportion	..	1	7	7	3	..	..
3.	Interest, Percentage, Worth, etc.		4	10	4	..	..	..
4.	Area and Volume	..	8	10	..	..	..	..
5.	Algebraic Laws and Four Fundamental Operations	..	..	9	6	3	..	..
6.	Products and Factors	..	..	..	..	.. 5	9	..
7.	Functions	..	..	15	2	..	1	..
8.	Simple and Simultaneous Equations	..	3	12	3	..	..	..
9.	Graphs	..	6	9	1	..	2	..
10.	Quadratic Equations	..	9	6	3	..	..	..
11.	Ratio and Proportion	..	8	10	..	..	..	..
12.	Elimination	..	7	8	3	..	..	..
13.	Surds	..	2	11	4	1	..	..
14.	A.P. and G.P.	..	..	1	7	7	1	2
15.	Logarithms	1	11	4	1	1	..	..
16.	Angles at a point	..	..	9	6	3	..	..
17.	Parallel lines	..	2	8	7	1	..	..
18.	Triangles and their properties	..	..	14	2	2	..	..
19.	Polygon and Parallelograms	..	1	12	4	1	..	..
20.	Areas	..	4	13	1	..		..
21.	Loci	..	7	11		..	..	..
22.	Circles and Tangents	..	..	12	5	1	..	..
23.	Trigonometry	..	6	8	2	2	..	..
24.	Integrated Problems	..	..	15	3	..	..	..

Information regarding the objectives is given in Table 11.

TABLE 11

Number of States at various difficulty levels of objectives

LEVEL/OBJECTIVES	DIFFICULTY VALUES 10-19	20-29	30-39	40-49	50-59	60-69	70-79
Primary							
Knowledge	..	2	7	8	1	1	..
Skill	..	..	1	7	9	2	..
Application	..	6	11	2	..	..	..
Logical Reasoning	..	4	8	6	1	..	..
Middle							
Knowledge	..	6	12	.	1	..	..
Skill	3	13	2	1	..	..	..
Application	6	12	.	..	..	..	1
Logical Reasoning	3	15	..	1	..	.	..
High							
Knowledge	1	13	4	..	..	..	..
Skill	..	8	7	3	..	..	..
Application	..	16	2	..	..	..	..
Logical Reasoning	..	15	3	..	..	..	..

These data reveal that our students fail rather miserably on application of knowledge to new situations, logical reasoning, evaluation, synthesis, and so on. Even on the knowledge items the performance is not very satisfactory. One of the explanations for this may be that some of the topics may not have been included in the syllabus of a given State. But then, a closer look at the difficulty values of topics which are definitely included in the syllabus of a given State and claimed to be taught, reveals that even items on such topics have proved difficult.

It is worthwhile to look into these data to locate topics that are most difficult as reflected by the average difficulty values. It is more meaningful, however, to look at these difficulty values not only at the national and/or State level but at the local school level.

The teacher who considers these difficulty values for his class can easily recognize what topics and objectives are troubling his students and can take appropriate remedial action.

Curriculum experts may also get clues regarding the kinds of difficulties students are facing, and can hence develop more appropriate teaching material.

The level-wise picture of achievement as revealed by these difficulty value tables is discussed below in brief.

Primary level

As the difficulty values reported indicate the percentage of students getting an item correct, one may frame a decision-rule that if a topic has an Average Difficulty Value of 30 or below, that topic needs more careful treatment as 70 per cent or more students have not mastered that topic. Such a decision-rule may change under improved conditions of teaching. A stage might reach where a teacher might expect that more than 50 per cent or 80 per cent of his students should master that topic and solve the items correctly. For the present, even when one sticks to a very low expectation of 30 per cent correct answers one finds a long list of topics which students in India are finding difficult.

The topics that could be considered difficult under this decision-rule, *i.e.*, with Average Difficulty Values as 30 or below at the Primary level are:

1. Percentage and Simple Interest,
2. Profit and Loss,
3. Fractions and Decimals,
4. Integration of Arithmetic and Geometrical Concepts,
5. Simple Proportion and Unit.

Middle level

Compared to the Primary level, the situation at Middle level is worse. One possible explanation is that in some States, algebra is not introduced at this stage while the tests had certain topics from algebra. But the performance even on topics from arithmetic and geometry is not satisfactory. The specific topics in which students in India are found to be particularly weak (under the decision-rule of 30 per cent Difficulty Value) are listed below:

1. Average,
2. Simple and Compound Interest,
3. Ratio and Proportion,
4. Percentage, Profit and Loss,
5. Speed,
6. Symbolic Representation,
7. Graphs of Statistics,
8. Simple Equations and Problems,
9. Simultaneous Equations and Problems,
10. Formulae,
11. Graphs,
12. Solids.

High School level

The picture presented by the Difficulty Value Table at the High School level is as bad as that at the Middle level. The possible reason that algebra was not being taught, which operated at the Middle level in some States, is not applicable at the High School stage. In fact, in many States the students selected for the Survey were in the last year of the Higher Secondary phase. And still it seems that many of them are weak even in certain basic areas.

The following topics have Difficulty Values below thirty:

1. Ratio and Proportion,
2. Interest, Present Worth and Discount, Stocks and Shares, Exchange,
3. Area and Volume,
4. Algebraic Laws and Four Fundamental Operations,
5. Functions,
6. Simple and Simultaenous Equations and Problems,
7. Graphs,
8. Quadratic Equations,
9. Ratio and Proportion,
10. Elimination,
11. Surds,
12. Logarithms,
13. Parallel Lines,
14. Triangles and Their Properties,
15. Polygon and Parallelogram,
16. Areas,
17. Loci,
18. Trigonometry,

19 Integrated Problems.

As regards differential performance on the various strata we may note the findings as follows:

1. *States*

The syllabi prescribed and emphasis given to different topics vary from State to State. As such no comparisons between States are made in this paper. All the comparisons reported below are within States where it could be presumed that the groups of schools follow more or less the same syllabi. In view of this, the public schools which prepare students for Indian School Certificate Examination and the Central Schools run by the Ministry of Education, both of which follow curricula different from that of the other schools in any given State, have been treated as special categories and not included in the States in which they are located.

The range of mean scores obtained by the States and the special category schools expressed in percentages at different levels is given in Table 5 on page 8.

It may be mentioned here that at the Primary level, although all the States had their mean score above the guess score, the maximum mean score a State has obtained is 25·27 (52 per cent) on test PI and 25·18 (51 per cent) on test PII, the maximum possible score being 50. The guess score at the Primary level is $50 \times \frac{1}{4} = 12{\cdot}50$.

At the Middle level, there are 70 items in the test. So the guess score is $70 \times \frac{1}{4} = 17{\cdot}50$. The mean score obtained by students from Public Schools, Central Schools and from schools in West Bengal and Orissa are higher than the guess score. The highest mean score at this level is 28·30 (40 per cent) on test MI and 26·21 (37 per cent) on test MII.

At High School level there are 80 items in the test. Students from the following States show an average performance better than the guess score, the maximum possible score being 80 and the guess score in this case $80 \times \frac{1}{4} = 20$.

1. Delhi,
2. Gujarat,
3. Kerala,
4. Maharashtra,
5. Orissa,
6. Haryana,
7. West Bengal,
8. Central Schools,
9. Public Schools.

The highest mean score obtained is, however, only 31·37 (39 per cent) on test HI and 31·70 (40 per cent) on test HII.

2. *Regions*

There are wide differences between the different regions of a given State, especially in those States where the regions have had different historical and linguistic backgrounds. For example, the Marathwada region which formerly belonged to the old Hyderabad State, had scored rather poorly as compared to Western Maharashtra (Ghats). The mean score on test HI of students of Marathwada region is 22 per cent where that of those from Western Maharashtra is 34 per cent. This magnitude of difference is maintained on the second form of the test also. The reasons for such differences could be investigated by the State authorities and steps taken to remedy them. In general one may say that those regions which were backward in education in pre-Independence India and those which are still backward in industrial/agricultural development have not pulled themselves up to the level of the other regions in the same States. Table 6 presents the sample sizes, means and standard deviations for the various regions in the several States.

3. *Sectors*

On the whole, students from urban areas show higher performance as compared to their counterparts from the rural areas. Table 12 presents the results for the States surveyed. There are, however, a few exceptions to this rule. For example, the primary schools from rural areas of Delhi and the primary and middle schools from the rural areas of

TABLE 12

Mathematics achievement of urban students vs. rural students

STATE/GROUP	TOTAL GROUP			REGION I			REGION II			REGION III			REGION IV			REGION V			REGION VI		
	P	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*
Andhra Pradesh	+	+	–	–	Telangana	–	–	Rayalaseema	+	+	Circars	–		..			..			..	
Assam	?	+	–		..			..			..			..			..			..	
Delhi	–	+	+		..			..			..			..			..			..	
Gujarat	+	–	+	*	Kutch	*	–	Saurashtra	+	–	Sabarkantha	?	+	Ahmedabad	+	+	Baroda	+		..	
Jammu and Kashmir	+		–		..			..			..			..			..			..	
Kerala	+	+	+	–	Southern	*	+	Central	*	–	Northern	*		..			..			..	
Madhya Pradesh	+	+	+	+	Gwalior	+	–	Indore	?	+	Bhopal	+	+	Mahakoshal	–	+	Chattisgarh	+	+	Rewa	+
Maharashtra	–	+	+	?	Marathwada	?	+	West Mhr.	=	?	Konkan	+	+	Vidarbha	+	*	Bombay	*		..	
Mysore	–	–	+	?	Bangalore	+	–	Hassan	+	–	Dharwar	+	+	Gulbarga	?	+	Mangalore	?		..	
Orissa	+	+	+	–	Cuttack	?	+	Balasore	+	?	Koraput	+	?	Sambalpur	–		..			..	

TABLE 12—*Contd.*

STATE/GROUP	TOTAL GROUP			REGION I			REGION II			REGION III			REGION IV			REGION V			REGION VI		
	P	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*
Punjab	?	+	+		..			..			..			..			..			..	
Haryana	+	−	+		..			..			..			..			..			..	
Rajasthan	+	+	+	?	Ajmer	+	+	Jodhpur	+	−	Bikaner	+	?	Udaipur	+	+	Kota	+		..	
Uttar Pradesh	−	−	−	+	Northern	−	−	Western	−	−	Eastern	?	?	Central	? −		..			.	
West Bengal	+	+	+		..			..			..			..			..			..	

+ : Urban students' achievement is greater than that of the rural students in both the forms.
—: Rural students' achievement is greater than that of the urban students in both the forms.
? : Urban students' achievement is greater than that of the rural students in one form and *vice versa* in the second form.
*: No students in the sample from rural area.

Mysore, Haryana and Uttar Pradesh have done slightly better than schools from the urban areas. It may be mentioned here that the I.E.A. study (Husen, 1967) does not lend strong support to urban superiority. Except in the U.S.A. and Japan, no significant difference was found in the achievement of these two sectors. Evidently then the important variable is not a sector *per se* but the differences on other variables like aspiration level, occupation and education of parents, facilities in schools.

4. *Management*

On the whole, Public Schools affiliated to the Council for the Indian School Certificate Examination (CISCE) have done better. But here the private management alone may not be the cause as the private schools which are not 'Public Schools' have not consistently shown better performance than the government schools. Therefore the reasons for the superiority of the Public School performance have to be looked for in other factors like the socio-economic strata feeding these schools. Government schools in States like Maharashtra and Gujarat, where they are run as model schools and are not in a majority, have shown slightly better performance than the aided or private schools in these States. The Central Schools, run by the Union Ministry of Education, have consistently shown better performance than either the State Government or private schools. It may, however, be noted that the private schools have done better than the government schools wherever the latter are in majority in a given State This suggests that it is not the management variable as such that may be crucial, but factors like financial support, the facilities available in these schools, the type of teachers and students found in these schools, and certain other factors like teaching methods and instructional material used.

5. *Age*

The most common trend in respect of age is that students of the modal age-group or younger students show better performance than those belonging to the higher age-group studying in the same class.

6. *Sex*

As expected, the boys have done better in most of the States but there are some remarkable exceptions. For example, the girls from the Mangalore region of Mysore State have done better than the boys from that region. In fact, their performance comes very close to the performance of the boys from Central and Public Schools. This again suggests that the superiority of boys may not be related to any genetic factors but to the culture in which the boys and girls are brought up and to the educational facilities provided to them.

Here again, the findings are to a very large extent consistent with the I.E.A. study. To quote from the present author's review of the I.E.A. study:

> Conventionally, boys are considered to be superior to girls as far as numerical ability is concerned, and the data, if analysed within countries, support this conventional expectation. But, again, the between-country analysis reveals the influence of other factors. It has been found that in those countries where the pattern is co-education schools rather than single-sex schools, the difference between girls and boys is less. This suggests that when the learning conditions are more alike, the differences in mathematics achievement between boys and girls will be markedly reduced. In the U.S.A. and Sweden, where the majority of students are in co-education schools, the difference in achievement between the sexes is the lowest It may also be mentioned that although the girls of a country are lower in mathematics achievement than the boys of the same country, there are a number of countries where the 'inferior' girls are superior to the boys of other countries. Sex differences in other words are a within-country phenomenon. Across countries, girls may be superior to boys in mathematics achievement, depending on the countries. This again suggests the importance of the variables which may be termed educational, that is, curriculum and methods of instruction which can compensate for the variables like socio-economic status, sex, etc. On the whole, educational differences among the countries far outweigh all the social and cultural differences within the countries. (Kulkarni, 1968.)

Table 13 presents the story in the States surveyed.

At the High School level data were also collected, through questionnaire, on some other important variables to find out their relationship with the achievement. From the data analysed so far (Haryana, Gujarat, Central Schools and Delhi) the following observations can be made.

7. *Socio-economic status*

There is no appreciable relationship between the composite score on the socio-economic scale and mathematics achievement. But significant positive correlations are obtained between mathematics achievement on the one hand and the level of father's occupation (status within an occupation) as well as level of mother's education on the other. It seems from this that parental income *per se* does not enable students to achieve higher scores. As regards the nature of occupation it was found that students whose parents are engaged in professional/technical occupations score higher than those whose parents are engaged in farming or unskilled labour, and so on. Here too, a comparison with the IEA study would be very interesting.

> In all the countries participating in the IEA study, a significant relationship was found between parents' characteristics (educational, occupational status) and students'

TABLE 13

Mathematics achievement of boys vs. girls

STATE/GROUP	TOTAL GROUP			REGION I				REGION II				REGION III				REGION IV				REGION V				REGION VI			
	P	*M*	*H*		*P*	*M*	*H*		*P*	*M*	*H*		*P*	*M*	*H*		*P*	*M*	*H*		*P*	*M*	*H*		*P*	*M*	*H*
Andhra Pradesh	+	+	+	Telengana	+	+		Rayalseema	+	+		Circars	+	+				..				.				..	
Assam	?	+	+			..				..				..				..				..				..	
Delhi	–	?	+			..				..				..				..				..				..	
Gujarat	+	+	+	Kutch	+		+	Saurashtra	+		?	Sabarkantha	+		+	Ahmedabad	+		+	Baroda	+		+			..	
Jammu and Kashmir	+	+	+			..				..				.				..				..				..	
Kerala	+	+	+	Southern	+		+	Central	+		+	Northern	+		+			..				..				..	
Madhya Pradesh	–	+	+	Gwalior	?		+	Indore	+		+	Bhopal	?		?	Mahakoshal	?		+	Chattisgarh	+		+	Rewa	–		+
Maharashtra	+	+	+	Marathwada	+		+	Western Mhr.	+		+	Konkan	?		?	Vidarbha	+		+	Bombay	?		?			..	
Mysore	–	+	–	Bangalore	–		+	Hassan	–		+	Dharwar	+		+	Gulbarga	–			Mangalore	?		–			..	
Orissa	+	+	+	Cuttack	+		+	Balasore	?		?	Koraput	+		+	Sambalpur	+		?			..				..	

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TABLE 13—*Contd.*

STATE/GROUP	TOTAL GROUP			REGION I			REGION II			REGION III			REGION IV			REGION V			REGION VI		
	P	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*	*P*	*M*	*H*
Punjab	+	+	+		..			.			..			..			.			..	
Haryans	+	+	+		..			..			..			.			..			..	
Rajasthan	+	+	+		..			.			..						..			..	
Uttar Pradesh	+	+	+	?	Northern	?	+	Western	?	?	Eastern	+	+	Central	–		.			..	
West Bengal	?	+	+					..			..			..			..			.	
C. S.	+	+	+		..			..			.			.			..			..	
P. S.	+	+	+		.			..			..			..			..			..	

+: Boys' achievement is greater than girls' achievement in both the test forms.
—: Boys' achievement is less than girls' achievement in both the test forms.
?: Boys' achievement is greater than girls' achievement in one form and *vice versa* in the other form.

mathematics achievement. The relationship is higher at the 13-year level and gradually decreases, primarily because of the reduced heterogeneity of the parental characteristics at the later levels of public education. The data also point out that the home background is associated with the student's educational aspirations (number of years of additional education expected or desired) and his occupational aspirations (expected or desired occupation) In a number of countries, the parents' background determines in part the type and level of mathematics instruction the student receives. Thus there is a complex set of interrelationships between the home background, the motivation and aspirations of the students, and the curriculum and type of instruction the student receives.

Although there is a consistent, positive relationship within a country between students' mathematics achievement and parents' characteristics, one gets remarkable differences between countries. If one selects the four nations with the highest scores on the mathematics tests for the population of 13-year-olds (Japan, Belgium, Finland and the Netherlands) and contrasts them with the four nations with the lowest scores (Scotland, France, the U.S.A. and Sweden) one finds that students with *fathers in the top occupations (professional and managerial) in the four lowest* countries achieve in mathematics at a lower level than do the children of fathers in the lowest occupations (unskilled and semi-skilled) in the four highest countries. This means that the differences among countries are so great that those who might be termed the 'culturally disadvantaged' group in one country achieve at a higher level than the most culturally advantaged group in another country. This is a very striking result which suggests that the curriculum and methods of instruction may be a far more influential factor than socio-economic class. This, of course, gives more hope to an educationist who considers education as a dynamic variable. (Kulkarni, 1968.)

8. *The student's attitude*

As regards the relationship between the student's attitude and the mathematics achievement, it was found that students getting higher scores express:

(i) greater interest in mathematics and would like to have more courses in the subject; (ii) view mathematics as a subject most students can learn; and (iii) consider mathematics useful for many occupations in present-day society.

On the other hand, students who consider mathematics as a dry subject or who think that one can get higher marks in mathematics by cramming the formulæ, score less than those who think otherwise.

It may also be mentioned here that 65 per cent students in Haryana, 39 per cent in Central Schools, 31 per cent in Gujarat, and 40 per cent in Delhi feel that only few persons can learn mathematics The percentage of students who consider mathematics as a dry subject is also considerable: 28 per cent in Haryana, 27 per cent in Central Schools, 9 per cent in Gujarat and 10 per cent in Delhi. The number of students who consider mathematics as a subject in which one can get high marks by cramming formulæ is still higher: 50 per cent in Haryana, 45 per cent in Central Schools, 28 per cent in Gujarat and 51 per cent in Delhi. There is also a significant minority of students who consider their mathematics teachers to be harsh and unkind people: 24 per cent in Haryana, 23 per cent in Central Schools, 11 per cent in Gujarat, and 29 per cent in Delhi.

School-related variables

Students who report that they usually get a higher score in their school examinations score higher on this test also.

Similarly, as one would expect, students opting for science/technical streams score higher than those opting for humanities/arts.

What about the help provided to students who need it? Apart from the studies in mathematics at school, only 31 per cent in Haryana, 37 per cent in Central Schools, 30 per cent in Gujarat, and 30 per cent in Delhi get some help from parents or friends.

About 66 per cent students in Haryana, 60 per cent in Central Schools and 83 per cent in Gujarat want to read more mathematics than that is usually taught in their school course. But of these, only 33 per cent in Haryana, 60 per cent in Central Schools, and 59 per cent in Gujarat can get books on mathematics other than their textbooks.

Percentile norms table

The results discussed so far pertain to groups of students. The detailed report includes also tables which could be useful for teachers and counsellors for studying an individual's performance in more detail.

Percentile norms at intervals of five are worked out for each State and for different regions and sectors (rural and urban) within a State.

Since a particular school system may be providing facilities very different from other systems, it would be useful if a school system prepared its own percentile norms. Such local norms would help to locate a student's position in a group studying under the same conditions and would thereby reveal his particular weaknesses or strengths.

Frequency distribution and frequency polygons for both the test forms at each level have also been worked out and are presented in the detailed report.

USES OF THE TESTS

The Survey was undertaken specifically with two major purposes in mind, The first purpose was to provide the school administrator with a more dependable and objective evidence for evaluating his school's efforts in mathematics education. The detailed report gives clues for such evaluation at the State and National level. But, more than that, school administrators at local or State level may administer these tests periodically and see whether their planned efforts to improve mathematics education have borne any fruits. The two equivalent forms could also be used in a study with a before-and-after design.

The second purpose of the Survey was to enable teachers to keep themselves more reliably acquainted with the educational development of individual students. Each and every teacher may not have time and the facilities to develop comprehensive and objective-based tests. He may, however, use these tests or develop others on these lines for an objective assessment of his students.

Another important feature of these tests is that they are sequential in nature. That is to say, the whole spectrum of the mathematics curriculum from Class I to Class X (Matriculation) is covered in this battery. Hence these tests could be used to assess a given student's growth in mathematics throughout his career in school. Has a student improved upon his mathematical ability in the last two or three years? This and other similar questions could now be answered to some extent by this sequential battery.

The usual purpose of testing for comparing the progress of different students for ranking them can also be served by these tests, in fact, more adequately so, by using the percentile norms table provided in the report and by computing local norms wherever possible.

Another major use of the test, which in the past has been overlooked, is to adapt instruction to the individual pupil's needs. A teacher would like to know what the misconceptions and weaknesses are shown by a given student. As stated earlier, the tests are of the multiple-choice type with four alternatives for each question. The alternatives used in these items are derived from a detailed study of errors committed by students and represent to some extent the common misconceptions.

A teacher can use the mistakes committed by his students, as revealed by their selection of certain wrong alternatives, for planning remedial instruction. In other words, although these tests are not primarily diagnostic in the sense of breaking down a given topic into all its detailed steps, they can be used diagnostically for certain broad purposes.

MISUSES OF THE TESTS

It is necessary here to point out along with the uses of the tests, some of the possible misuses of such tests and surveys which should be avoided.

1. *Rating teachers on test results*

In certain quarters there is a trend to attribute the students' performance on a given test to teachers. Although a teacher is an important component contributing to the students' learning, he is not the only component, and hence students' performance, good or bad, should not be entirely explained in terms of their teacher's ability. It is hoped that the administrators, educational planners and teachers work together to locate the weaknesses in the performance of students and try to design a comprehensive and effective strategy to overcome them.

2. *Coaching of test content*

Sometimes, because the tests are used only for purposes of 'examinations' and ranking, and not instruction, some students try to cram the answers of specific items in a given test. And some teachers encourage them to do that. Such coaching on a specific test must be avoided.

There are two equivalent forms of this test. One form could be made available to the students by a teacher who focuses their attention to the variety of problem situations and the complexity of educational objectives like application to new situation and logical reasoning. The teacher should then provide proper instructional material and a series of items, free-response or otherwise, to the students to assess themselves. This may change the tendency to work only for the 'examination' and urge students to study for attaining the long-range objectives of education.

SCOPE FOR FURTHER WORK

The specific reasons for the weaknesses and strengths of particular regions or groups of school systems could be explored. Further, more comprehensive diagnostic tests for classroom use should be prepared, which may lead to better instructional material for remedial and accelerated programmes. Thus, on the basis of the Survey results, various projects like these could be undertaken. The Survey is only a beginning in that direction. This future work has to be done at various levels by the teacher in the classroom, by researchers in State Institutes of Education and/or training colleges, and other similar categories of workers The NIE would provide survey data and other necessary help for all such projects.

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Jamshedpur: The Case for an Expanded Theoretical Framework to Integrate Education, Society and Productivity

Joseph Di Bona

In this study of the Tata enterprises at Jamshedpur, the author examines some of the generalizations and proposals put forward by various manpower planners and argues that today's planners and educators must not only fit an educational scheme to a particular economy but must also be able to predict consequences in a sophisticated framework combining the insights of education, anthropology, psychology, economics and other social disciplines.

Developing countries from Kenya to Columbia are seeking to increase productivity through a judicious assignment of scarce resources to schools and factories. Although the debate over the optimum 'mix' between education *versus* capital goods is hardly settled, new theoretical complications are superseding older arguments. Today's planners and educators must not only fit an educational scheme to a particular economy but must also be able to predict consequences in a sophisticated framework combining the insights of education, anthropology, psychology economics and other social disciplines. It may be possible to show a man how to run an automated shoe machine in six weeks only to find that he prefers a lower-paying clerical occupation. Such unanticipated consequences of education, as Margaret Mead has shown, are sometimes comic, often tragic, but always costly to the economies of new nations.

Generalizations concerning the happy prospects education holds for development are part of the stock-in-trade of modern manpower planners. For some, India, like England, can expect the industrial process itself to induce appropriate skills without benefit of any deliberate governmental policy. Baldwin (1960), on the other hand, favours a plan that mimics the Japanese pattern of growth in which foreign experts are imported and government factories are used as training centres. In the present paper, such unidimensional proposals are examined in the light of what is probably the most successful development effort in the world, that of the Tata enterprises in the Indian City of Jamshedpur. That Company sought to introduce the most modern technical innovations into a primitive area of largely illiterate tribal people. An enlightened management exhibited a genuine concern for worker welfare and provided ample benefits, without previous precedent in India.

From the Tata example, Galenson (1959) argues that the industrial enterprise itself rather than government, church or private foundation is best suited to educate its workers. Harbison and Ibrahim (1958) agree that most skills, even clerical ones, can best be acquired on the job without benefit of the formal classroom. This is true in the case of the Indian Tube Company of Jamshedpur where the whole enterprise proceeds smoothly with a small staff of foreign-trained engineers and a large cadre of illiterate or near-illiterate workers. Union Carbide's Calcutta plant for flashlights and accessories operates on a similar principle. The implications of this experience for educators and manpower planners can be examined in two parts. First: is the long-run efficiency of illiterate labour really as high as is often claimed? And second: does formal education produce the negative results that management sometimes fears? Kerr and Dunlop (1960), for instance, think that the high prestige value of reading and writing in developing countries may easily woo labourers into non-manual and governmental employment.

When manpower planners speak their minds, they are likely to be concerned with such tangibles as improved skills, maximized use of skills in short supply and the development of managerial ability (Wertz, 1960). There is little humanistic or civic-minded educational nonsense in this hardheaded approach. Workers in India, unlike their organized counterparts elsewhere, tend to be regarded by planners as docile, expendable and infinitely malleable. Of course they are not. But within the cozy parameters of abstract statistical projections, there is a tendency to neglect 'the human factor', so much a part of the educator's intellectual baggage. It is only during times of crises when there are strikes or riots that the problem of values is broached and planners reach out for the insights of other social disciplines.

It is already amply evident that industrialists and planners must concern themselves with the attitudes and feelings of workers as much as with the more common measurements of productivity. The necessity of this expanded theoretical framework is clear in the case of Jamshedpur and may serve to contribute to a more refined analysis of the relationship between education, planning and productivity.

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The Jamshedpur case

Jamshedpur was the site chosen for the beginning of the Indian steel industry because of the fortuitous circumstance combining coal deposits, iron ore, limestone, rail connections and a water supply. It was started at the beginning of the present century by Jamsetji Tata with capital raised in India largely from the Parsee community of Bombay. Since its inception, the importance of Jamshedpur and the steel industry have grown rapidly. In 1911 there were 6,000 people in the city. In 1958 this figure was 2,50,000, and in 1962 closer to 3,25,000. With recent expansion completed, Tata Iron and Steel can now produce two million tons of finished steel a year and remains the largest producer in India. From the beginning, Tata tried to make Jamshedpur a model industrial city for India. The Company alone provides all essential municipal services such as water, sanitation, lighting, hospitals and schools. In addition, it provides workers with houses to live in, low-cost food to eat, cinemas, playing fields, restaurants, and practically every other facility in the city (Elwin, 1958).

At first, skilled foreign personnel were imported to build and operate the steel plant. The blast furnace staff was largely American, the steel works crew German, the rolling mills were staffed by Englishmen, the clerical staff was chiefly composed of Bengalis and Madrasis. The workers in the carpentry and pattern shops were Chinese, and the great majority of unskilled workers were tribal Santals, Hos and others. Under the insistent prodding of the Tariff Board, the Indianization of the industry has been moving ahead but even today the polyglot nature of Jamshedpur is still apparent. At present, only 4·91 per cent of the workers come from Singhbum, the division of Bihar in which Jamshedpur is located, while 51·18 per cent come from other parts of India (Misra, 1959). TISCO has been proud of the fact that this diversified labour force has been free of the kind of communal tension that might interfere with essential production Nor have the traditional caste animosities been troublesome as new work skills are acquired by particular groups. The masonry work of putting refractory linings in furnaces, formerly a low-caste occupation, has been performed by higher castes without difficulty. Even during partition when religious feelings were at that height, Jamshedpur remained quiet. The Company likes to say, "There is little time in a great steel works to think about your neighbour's race or caste" (Elwin, 1958, p. 101).

This positive view may be a myth but it is one the Company has assiduously sought to cultivate. It flows naturally from the paternalistic philosophy of Dorabji Tata, the founder of the Company:

> The welfare of the labouring classes must be one of the first cares of every employer Any betterment of their condition must proceed more from the employers downward than be forced up by demands from below (Elwin, 1958, p. 100).

This attitude is consistent with the fact that 25 of the 31 square miles comprising Jamshedpur are owned by TISCO. Without aid from government, the Company bears the entire burden for organizing, managing and financing welfare services in the town. The policy has not been without its critics. One objection is that the felt needs of the community cannot find expression in a political arrangement which deprives workers of their citizenship. In such a context, the resentment and grievances manifested in the 1958 strikes, which rocked Jamshedpur and resulted in four deaths and hundreds injured and the shut-down of the steel plant, were not irrational accidents but predictable consequences of short-sighted management policies.

It is a tribute to TISCO that the Company itself is now beginning to see some of the problems that may arise in the kind of industrial complex that has been created in Jamshedpur. In July 1956, at the Duke of Edinburgh's Study Conference at Oxford, J. R. D. Tata gave these three requirements of successful industrial development :

1. Provide basic needs, wages, conditions, benefits,
2. Satisfy self-expression and provide for individual worth,
3. Cope with the special problems of the worker recently transplanted from a village to a modern industrial urban community.

The shift from rural to urban centre is a difficult change everywhere. Bewildered, unhappy and resentful, the workers suffer acutely from the loss of traditional associations and values. No amount of planning has yet been able to ease the severe stress created by the very industrial process which aims to lift developing regions out of a subsistence economy. And yet it is precisely here that our theory of industrial management requires the most work. The value-orientation of workers is not easily seen nor measured but remains of crucial importance for industrial results. It is an area where educators are more at home and where their contribution seems most promising.

One symptom of alienation, watched closely by management, has been the worker's commitment to his job. Or, to put it another way, how important is the job to the worker? Is it attractive enough for him to forgo a trip to the village where his help with the crops is needed? Will he suffer the displeasure of his friends and relatives in order to live in a more convenient part of the city? Morris (1958) found a strong sense of identification developing amongst workers. He cites the fact that in 1952 more than 71 per cent of the permanent work force were employed for more than ten years. Likewise, Elwin says that 5,000 workers had put in more than 30 years' service. Absenteeism which once plagued the steel industry has disappeared as has the seasonal worker. Jamshedpur industry can now demand and get workers completely committed to industry as their sole means of support. Not since 1930 has unskilled labour been scarce enough to enable workers to leave industry at will and be received back with open arms. Misra (1959, p. 170) is less convinced that real change has taken place or that the worker's attitude is significantly altered. Only 15·4 per cent live in houses they own. The rest are like transients who have acquired no long-term interest in the city. Only 29·13 per cent of the immigrants did not visit their native places in a single year while 54·89 per cent paid casual visits and the rest frequently returned. Typically, the worker lives in a house that he does not exclusively occupy. That overcrowding is acute, may be judged by the figure Misra gives of 30·33 square feet of space as the median per family. If, despite long and intensive exposure to an industrial setting, his commitment to an urban environment remains marginal, what is the appeal of this great city for the worker?

Overcrowded, alien, its people separated from home and family, still Jamshedpur attracts more persons than can be employed. A partial answer is supplied by Orans (1958), an anthropologist who studied the Santals in Jamshedpur. If asked why they came to the city, the most common answer was, "I came for the sake of my stomach," and less frequently, "I came to improve myself." As important probably, is the freedom a city provides from the strictures of village life. Almost all the tribal Santals in the city have settled or the periphery of Jamshedpur Their settlements or *bustees* lie three to ten miles from the edge of the city, are of mud and approach as near as possible the village atmosphere. For these Santals the city may be a treacherous place inhabited by evil spirits. Of the few Santals who live in the city proper, Orans reports a rapid attachment for the amenities of tap-water, electricity and special sanitation. These persons are the ones who are more skilful, less superstitious, and less likely to maintain strong village ties. As a group, however, the Santals were the less-favoured community and amongst them the Communists predictably gained their first supporters in 1958. This was a shock to TISCO officials who viewed these developments as an index of Communist skill rather than of a fertile environment where political propagandists could be effective.

Controlling as the Company did, both the educational input and the industrial outputs of the workers, they failed to take account of the affective atmosphere of the city This inability to understand the complexity of the problem was a contributing factor in the strikes of 1958 and accounts for the continued uneasiness in the steel centre today

Immediate causes

The immediate causes of the 1958 strike go back to the Second World War, when TISCO hired a great many extra workers in order to maximize production. Profits were controlled and there was no pressure to keep employees at the most efficient level. After the war, TISCO wanted to expand and rationalize its operation. In order to do this, an elaborate plan was proposed to bring the concerned workers into direct consultation with the Company. This laudable and revolutionary idea was presented to the Tata Workers' Union and their President, Michael John. The proposed contract called for doubling the steel output without hiring additional labour. This could be accomplished by using the excess labour already employed. The plan further called for joint union labour councils for settling differences, cutting costs, and improved safety and working conditions. During the period of expansion (it was to last some three years), the union was to refrain from seeking wage increases. At the end of that time there was to be some form of profit-sharing to compensate the workers for their part in making it all possible. This agreement was signed in 1956 and was considered a milestone in Indian labour relations, because it provided for direct bargaining between union and management without the presence of the government. The almost universal approval of the agreement may be due to what Van D. Kennedy has called its embodiment of such basic Indian values as paternalism, harmony and norms. The last refers to the idea that in all conflicts there is one right or best solution (Kennedy, 1958).

Content with the feeling that the workers had gained a direct and personal interest in the prosperity of the Company, TISCO presented the Union President with a Mercedes-Benz for his personal use In 1957, the Communists won a seat in the Bihar Legislature from Jamshedpur. An All-India Trade Union Council (CP.) Action Committee led by S. A Dange condemned the 1956 agreements and revived the Jamshedpur Mazdoor Union which struck the Telco and Tinplate Plants in the city The first union supporters were expectedly from among temporary workers fearful of losing their jobs. Several other grievances were quickly added to the list of issues, the most important of which was wages. The workers' wage was a complicated conglomeration made up of a basic wage, dearness allowance (a sort of cost-of-living adjustment) a variety of bonuses, concessions in kind and other income. For the average worker this was too complicated to understand clearly and reason out accurately.

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Most workers tended to trust their leaders as a matter of course. But their lack of education and experience allowed them to shift allegiances dramatically once that trust was questioned. The result was a resentment and hostility that surprised everyone (Morris, 1958).[1] The workers' inability to read or write serves as a barrier to the communication of ideas in the large impersonal industrial union that is the Indian pattern. As a consequence, the lesson is that for illiterate labour, violence is always a means of expressive action. In May 1958, it was clear that the Tata Workers' Union which signed the 1956 agreement had very little real support. Barred from participation by virtue of his illiteracy, and sensing the danger of losing his job, the worker sought direct action to protect his job. This was the programme the J.M.U. supplied and it accounts for its rapid rise to power. Had TISCO or the Tata Workers' Union been able to supply an alternate channel of expression, there seems little doubt that the Communist union could have not made the headway it did. For here was a labour force dedicated to the industry it served. There was a long history of labour peace. There was every prospect of continued social and economic betterment and yet, at this very moment of high anticipation, the wonderful edifice extolled by government, union and company came tumbling down.

Schools and a changing regional economy

If neither industry nor union are able to prepare workers for life in Jamshedpur, the schools are no more promising. Instruction mirrors the ethnic checkerboard that is the city with Bengali, Hindi, Urdu or Telugu, each contributing to the maintenance of separate identities for local children. The curriculum is organized on the basic pattern of craft education originally designed to serve a village society. Much time is assigned to such subjects as spinning, woodwork and agriculture practice.[2]

After 50 years of existence in Bihar, what has the presence of this large industrial complex meant for the State as a whole? Have the effects of industrialization benefited the larger population not directly involved in industry? Have the skills acquired in industry been carried over to other types of activity?

The general economic picture of Bihar is not good. In the last 20 years the death-rate has fallen from 21·7 per 1,000 to 10·2 per 1,000 while the infant mortality rate has gone from 1 : 35,000 to 1 : 55,000. Population pressure has increased; there is a greater dependence on agriculture, and the available land has decreased.[3] Only 17 per cent of the Bihar population is located in urban centres as compared with 17·3 per cent for all India. Most of these towns are not urban centres at all but overgrown villages whose growth is due to the addition of administrative units and not industry. Of the few industrial cities in the region, the Techno-Economic Survey[4] reports that they are like oases, outside a few miles of which the desert of primitive economy still stretches in a wide expanse. Even the number of workers dropped by more than 6,000 in Singhbum, while the number of firms rose from 404 to 527.

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[1] Morris, D. Morris was present during the strike and reports the importance of rumour in a city where no newspapers are published.

[2] India Republic, *Difficulties of Basic School Teachers,* National Institute of Basic Education, New Delhi, 1960; India Republic, *Measuring Educational Potentiality of Crafts,* National Institute of Basic Education, New Delhi, 1957.

Against this sad picture, the political organization of Jamshedpur as a company town wholly owned and operated by TISCO seems an unlikely soil in which entrepreneurial talent may grow If Fr. Berna's experience in Madras (Berna, 1959) is applicable to the North, this lack of business experience and education will combine to further inhibit new ventures likely to spread the effects of industrialization. Most articles of daily consumption are still imported from outside, bank financing of wholesalers and co-ops. for the lowest-paid workers are only beginning. Less than 10 per cent of the population living in the city are not engaged in industry, and of this group, most are in the retail trade. Although their educational level is higher than that of the general population, their earnings are lower. It has been argued that this indicates a drift away from manual labour as education rises and therefore it is foolish to try to educate workers in any academic way. More probably, certain castes pursue their traditional occupations in business regardless of income, and the case for increased worker education remains intact. The connection between education and increased aspirations is commonly accepted and can create the enterprise that is sorely needed in the area.

Summary and conclusion

The model industrial settlement founded fifty years ago by Tata enterprise in an undeveloped area of Eastern India introduced a number of progressive reforms such as health and housing measures, civic improvements, sanitation and practical education. At its inception, there was a challenge and excitement surrounding the new steel complex. Capital had to be raised by the Indian community itself, engineers hired and the factories built. Local labour, then considered tribal and primitive, has changed greatly over the past half-century. No longer can they be considered an inert mass of potential manpower without organization and personal interests. Instead, they have increasingly demonstrated their determination to help influence their environment.

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3 & 4 India Republic, *Techno-Economic Survey of Bihar*, National Council of Applied Economic Research, New Delhi, 1959.

The educational system has failed to provide workers with the range of social and emotional skills necessary for urban living and, as a result, they remain today easy prey to unscrupulous politicians. In the past, this citizenship-training has been avoided because it was thought to unduly raise aspirations or alienate workers from the job. But the cost of such a policy has been an unstable work force with no commitment to urban life or promise for regional development.

One direction we can expect events to lead is towards greater participation of workers in local councils which make education policy The communal nature of the schools raises considerable difficulties here, but changes will certainly be forthcoming both in curriculum and in financing. Specifically we can expect a widening of the vocational content of courses to include more general and academic subjects In the hands of local inhabitants, it is likely that the basic educational philosophy will be replaced by one more in keeping with the competitive examination orientation found elsewhere in India. Despite some obvious disadvantages, such changes will allow the citizens of Jamshedpur to feel they are being treated at least as well as others in India. With such opportunities to go on to higher education available, there is every promise that this will contribute to the development of a commitment to the local community that has been lacking in the past.

It will be necessary for Tata Industries to enlist the aid of educators and anthropologists in projecting manpower requirements into the future. The quality of the worker no longer means his skills but his mental set and life style as well. With this added value dimension included in a sophisticated development model, we can expect more fruitful results from economists and planners alike.

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Functional Status of Rural Primary Schools in Rajasthan

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To find out how primary schools in the rural areas of Rajasthan are functioning under the Panchayat Samitis, the authors undertook an intensive study of the primary schools of Jobner in Jaipur District. In this paper they discuss in detail the trends in enrolment, the pupil-teacher ratio, adequacy of accommodation, the seating arrangements for pupils, and availability of other similar facilities as revealed by the data.

Education in rural areas has been one of our major concerns since independence, and though some progress has been made during the subsequent years quantitatively, we lag far behind as far as the quality of education is concerned. The importance of primary education as a basic foundation for regenerating rural society can never be exaggerated.

In Rajasthan, the responsibility for primary education has lain with the Panchayat Samitis (earlier the Community Development Blocks) since 1959. Because the large and fast-growing population is mostly rural (83·9 per cent) and the villages are small and scattered, and also because of cultural and economic factors, primary education in Rajasthan has been relatively more difficult and costly. "Taking the Indian Union as a whole," states the *Report of Rajasthan State Primary Education Committee* (1965), "Rajasthan stood second from the bottom, the least advanced State being Jammu and Kashmir."

To evaluate how the primary schools are running under the Panchayat Samitis, and how they are serving the rural youth and the village communities, the present study was planned and executed during 1966–67. In this study, an attempt was made to examine intensively and comprehensively the various aspects of the working of primary schools in order to assess the functional status of these educational centres which are integral parts of the Panchayat Samitis.

Methodology

As the intention was to do an intensive study, the sample size was confined to the primary schools of only one Panchayat Samiti, that of Jobner in the Jaipur District of Rajasthan State. There are 90 primary schools (81 for boys and nine for girls) under the Panchayat Samiti in question, and all were considered in this study.

A comprehensive questionnaire with structured and unstructured items was developed. The questionnaire was mailed to the headmasters (or other persons in charge) of the schools. Out of the total population of 90 headmasters (or others in charge), 79 headmasters (88 per cent) returned the questionnaire through mail. In this paper, for the most part, a descriptive study has been made of these returns. However, care has been taken to analyse the data very minutely in order to derive the maximum meaning.

Analysis of data

We shall begin with data that reports the distance between the schools and some of the basic institutions and important places. The relative distance would indicate the availability or otherwise of some of the facilities which help or hinder the process of the student's progress in the school.

The data indicates that out of the schools reported on, 76 per cent (*i.e.,* 60 schools) are located at a distance of between 10 and 30 miles from the Panchayat Samiti Headquarters. The nearest town for 92·3 per cent schools (73 schools) is within a radius of 10 miles.

The data further reveals that 31·6 per cent schools (25 schools) have the facility of a bus stand right in the villages where they are situated, whereas 54·4 per cent (43 schools) are within a radius of five miles. Fourteen per cent (11 schools) are situated within about 10 miles of the bus stand. As for the facility of the post-office, the data show that only 39·24 per cent schools have a post-office right in their villages; 59·5 per cent schools have a post-office within a radius of five miles; and the remaining 1·3 per cent schools are situated about 20 miles from a post-office.

The data also reveals that 63·34 per cent schools are situated within a radius of five miles from the nearest railway station; 30·36 per cent are six to 20 miles away; and only 6·3 per cent schools are just near the railway station.

As regards medical facilities, only 13·9 per cent schools are situated near the dispensaries; 60·8 per cent are situated within a radius of five miles; and 25·3 per cent are about six to 20 miles from the nearest dispensary.

Out of schools studied, the first school came into existence in 1917, and the last school in 1965. Out of 79 schools, in the First Five-Year Plan period the maximum number of primary schools (*i.e.,* 34) were opened; in the Second Five-Year Plan period 18 were opened; and in the Third Five-Year Plan period, only 11 schools were established.

There are 17 schools which have been functioning for the last five years; 13 for the last 10 years; 33 for the last 15 years; 10 for the last 20 years; and only three schools for the last 25 years. One school has been functioning for the last 30 years, one for 40 years, and one for the last 50 years.

Another thing clear from the data is that 86·1 per cent schools are running all the primary classes; about 10·1 per cent have classes up to Class IV; 2·5 per cent up to Class III and 1·2 per cent up to Class II only.

Table 1 below represents the enrolment trend in the schools for eight years, *i.e.,* from 1959 to 1966 It is obvious from the data that the difference between the total enrolment (both boys and girls) for the years 1959 and 1966 is 3,420. This means the total strength in the year 1966 has increased to 2·44 times the strength in the year 1959 Further, there has been a definite trend of gradual increase in the total enrolment in the schools.

TABLE 1

Student's strength in the selected schools and the enrolment trend for the period 1959–1966

YEAR	TOTAL NO. OF STUDENTS	BOYS	PERCENTAGE	GIRLS	PERCENTAGE	BACKWARD AND SCHEDULED CAST (BOYS AND GIRLS)	PERCENTAGE
1959	2375	2049	86·2	326	13·8	443	18·6
1960	2957	2610	88·2	347	11 8	635	21·5
1961	3348	2766	82·6	582	17 4	603	18·0
1962	4600	3655	79 5	945	21·50	944	20 5
1963	5043	4132	81·93	911	18 07	1071	21·2
1964	5138	4208	81·9	950	18·1	1109	21·5
1965	5743	3603	80 1	1140	19·9	1260	21·9
1966	5795	4533	66·7	1262	33·3	1264	18·6

Considering the strength of boys and girls in schools separately, it appears that about 80 to 88 per cent of the total enrolment is represented by the boys and about 20 to 22 per cent by the girls. There is no marked change in this pattern for all these eight years except in the year 1966 when the percentage of boys dropped down to 66·7 per cent and the percentage of girls had gone up to 33·3 per cent On an average, the girl-boy ratio is found to be 1:4 as against the national ratio of 1 : 5 for the year 1951–52.

Further, the data show that though there is an increase in the enrolment of scheduled castes and the backward classes, the proportion in relation to the total enrolment remains more or less constant.

Table 2 shows the strength of teaching and non-teaching staff in the schools. The strength of teaching staff rose from 82 to 156 during eight years The teacher-student ratio in the year 1959 was 1 : 29 whereas in 1966 it was 1 : 37. Out of these teachers, the male teachers varied from about 90 to 95 per cent and female teachers from 10 to five per cent. The non-teaching staff also went up three times. There is a definite trend indicated in the table that the female non-teaching staff are gradually on the increase. The reverse is true for the male non-teaching staff.

TABLE 2

Strength of teaching and non-teaching staff and their ratio from 1959 to 1966

YEAR	TEACHING STAFF					NON-TEACHING STAFF					NON-TEACHING STAFF RATIO
	Total	Male	Percentage	Female	Percentage	Total	Male	Percentage	Female	Percentage	
1959	82	77	93·9	5	6·1	15	7	46·7	8	53·3	1: 11·7
1960	190	86	95 5	4	4·5	18	10	55 6	8	44·4	1: 9·0
1961	107	101	94·4	6	5·6	21	10	47·6	11	52·4	1: 10·7
1962	142	129	90·8	13	9·2	32	12	37 5	20	62·5	1: 4·4
1963	151	139	92 0	12	8·0	37	10	27·0	27	73·0	1: 4·0
1964	157	141	89·8	16	10·2	42	16	38·1	26	61·9	1: 3·7
1965	156	139	89·1	17	10·0	44	16	36·4	28	63·6	1: 3·5
1966	156	142	91·0	14	9·0	45	16	35·5	29	64·5	1: 3·4

As is obvious from Table 2, the proportion of non-teaching staff to teaching staff has increased over the years. In 1959, on an average, there was only one member of the non-teaching staff for about twelve teachers, whereas in 1966 there were two non-teaching staff members for seven teachers only. The strength of non-teaching staff has been greatly enhanced.

The student-teacher ratios existing in the schools are given in Table 3.

TABLE 3

Student-teacher ratio in the selected schools from 1959 to 1966

STUDENT-TEACHER RATIO	NUMBER OF SCHOOLS YEAR-WISE							
	1959	1960	1961	1962	1963	1964	1965	1966
25: 1 and below	24	19	23	20	11	11	10	9
26: 1 to 30: 1	11	10	11	15	23	23	14	12
31: 1 to 40: 1	11	13	16	22	29	32	40	37
41: 1 to 50: 1	2	5	7	8	8	7	9	13
51: 1 to 60: 1	2	4	2	1	2	3	6	6
61: 1 and above	.	1	. .	2	1	.	. .	2
Total	50	52	59	68	74	76	79	79

A closer view of the data in Table 3 would indicate a lot of variations in the student-teacher ratios. In 1959, for example, out of the total of 50 schools, 24 schools had a student-teacher ratio from 26 : 1 to 30 : 1; eleven schools from 31 : 1 to 40 : 1; two schools from 41 : 1 to 50 : 1; and two schools from 51 : 1 to 60 : 1.

TABLE 4

School-going and non-school-going youngsters of school-age in 79 villages

ITEM	BOYS	GIRLS	TOTAL
Total number of school-going children in 79 villages	7755	3768	11523
Total students enrolled	4533	1262	5795
Percentage of children not going to school	41·6	66·5	49·7

From the school records, the total strength of the school-going and non-school-going boys and girls was obtained. The data in Table 4 reveals that 41·6 per cent of the boys and 66·5 per cent girls of school-age are not availing of the schooling facility. Further, in all about 50 per cent of the boys and girls of school-age are not going to school.

Table 5 presents the building facility as it existed in the rural primary schools in question in the year 1966.

TABLE 5

Buildings

SCHOOLS	BUILDINGS OWNED		IF OWNED, CONDITION		ADEQUACY OF ACCOMMODATION	
	Yes	*No*	*Kuccha*	*Pucca*	*Yes*	*No*
Running up to Class I	.	..	..	..	..	..
Running up to Class I	..	1*	..	..	..	..
Running up to Class III	2	..	..	2	..	2
Running up to Class IV	6	2		6	1	5
Running up to Class V	58	10	11	47	6	52
Percentage	83·5	16·5	16·7	83·3	10·6	89·4

* Runs in a dharamsala

The data in Table 5 reveals that out of 79 schools, 66 schools (83·5 per cent) have their own buildings and 13 schools (16·5 per cent) do not so far. Schools without buildings hold their classes either under the shelter of trees or in huts or rented buildings. One school uses a dharamsala. Out of the schools (66 schools) having their own buildings, 83·3 per cent of them have *pucca* buildings and the remaining 16·7 per cent have *kaccha* ones. The data further show that even though a good percentage of the schools have some kind of building, 89·4 per cent of them do not possess adequate accommodation for the various classes.

TABLE 6

Facility for gardening

SCHOOLS	AVAILABILITY OF LAND			AVAILABILITY OF WATER			EQUIPMENT FOR GARDEN		
	Yes	*No*	*In-sufficient*	*Yes*	*No*	*In-sufficient*	*Yes*	*No*	*In-sufficient*
Up to Class I	..	.	..	..	.	..	..	..	..
Up to Class II	..	1	..	..	1	..	..	1	..
Up to Class III	1	1	..	..	2	..	.	2	..
Up to Class IV	3	5	..	1	7	..	..	8	..
Up to Class V	27	34	8	18	45	5	2	63	3
Percentage	39·2	50·7	10·1	24·0	69·5	6·4	2·5	93·8	3·7

The analysis in Table 6 reveals that 59·2 per cent of the schools have land for gardening; 50·7 per cent do not possess any land at all; and 10·1 per cent do possess land but insufficient in area for the purpose.

The availability of water is even poorer. Only 24 per cent of the schools have water available; 6·4 per cent have water but not enough for gardening.

Further, gardening in the primary schools is handicapped by the fact that the schools having water do not necessarily have the land also. In some schools, the water available is not suitable for irrigation. The condition of the gardening equipment in schools is still more deplorable.

The existing facility for school gardening, as revealed above, is not compatible with the requirements of the primary schools syllabi (Government of Rajasthan, 19) which provide for training for the students at least in rudimentary agriculture. Under these conditions, the aim of "introduction of work-experience as an integral part of primary education" (Education Commission, 1964–66) cannot be fulfilled.

To live up to the principle of educating for a sound mind in a sound body, our schools must provide adequate facilities for games and sports, including games equipment. This is essential for the health of the youngsters which has a direct and positive relationship with their mental soundness and growth.

TABLE 7

Facilities for games and sports

SCHOOLS	PLAYGROUND			GAMES EQUIPMENT		
	Yes	*No*	*In-sufficient*	*Yes*	*No*	*In-sufficient*
Running up to Class I	..	..	..	..	..	..
Running up to Class II	1	..	..	..	1	..
Running up to Class III	1	1	..	..	2	..
Running up to Class IV	1	7	..	..	8	..
Running up to Class V	10	15	7	12	30	26
Percentage	16·4	74·7	8·9	15·2	51·9	32·9

The data in Table 7 does not show a happy situation in this respect. Only 16·4 per cent of the schools have sufficient playground area; 8·9 per cent do not possess sufficient area, though they do have some. Some of the schools do use *gocher bhoomi* (pasture land) for playing but these grounds cannot be fully developed for the school purposes for want of legal authority.

A similar situation exists in relation to the equipment and materials for games and sports It was found that the materials available with many of the schools were not in good condition. It was further noted that the students in the majority of the schools commonly play *kabbadi, kho-kho,* ring-ball and football.

Table 8 below includes some information on teaching aids commonly being used in primary schools. On the basis of observation and discussions with school teachers, six teaching aids which are very fundamental were considered to be extremely important for all the primary schools.

TABLE 8

Essential teaching aids

SCHOOLS	BLACK-BOARD	MAPS	GLOBE	COUNTING CHART	VARNMALA CHART	MODELS	ALL EQUIPMENT
Running up to Class I	.	..	.	..	..	..	.
Running up to Class II	1	1	.	1	1	..	.
Running up to Class III	1	1	..	1	..	..	.
Running up to Class IV	7	6	3	5	4	2	2
Running up to Class V	62	53	15	42	43	14	8
Percentage	89·8	77·2	22·8	62·0	60·7	20·0	12·7

A look at Table 8 clearly indicates that the facility for teaching aids in primary schools is very inadequate. It seems that the majority of the schools have blackboards (89·8 per cent), maps (77·2 per cent), counting charts (62·0 per cent), and varnamala charts (60·7 per cent). But the globes and models available are extremely limited. Also, only 12·7 per cent of the schools have all these essential teaching aids. It may also be noted that several schools have maps, charts, etc, but not in good condition.

From the data in Table 9, it is quite evident that the library facility in rural primary schools is indeed extremely poor. In most of the schools (excepting two), though the library facility seems to exist, the requirement of even an average library does not appear to have been met. The data for eight years indicate that the number of books including magazines, periodicals, etc., per school vary from 86 to 125 only. Further it was found that even these limited books are not the ones which are very much needed for school students. Most of them are old books donated by the villagers and other individuals. Surpris ingly enough, only two schools out of the total number studied have an almirah to keep the books.

TABLE 9

Adequacy of the library facility

SCHOOLS	LIBRARIES IN SCHOOLS	ALMIRAH FOR KEEPING BOOKS	NUMBER OF BOOKS* FROM 1959–66							
			1959	1960	1961	1962	1963	1964	1965	1966
Running up to Class I	.	..	..	..	..	..	..	..	..	..
Running up to Class II	1	.	..	.	..	25	26	51	63	100
Running up to Class III	2	..	..	.	.	..	.	..	98	98
Running up to Class IV	8	.	412	462	492	537	537	589	742	864
Running up to Class V	66	2	6353	6736	7328	7523	7616	7861	8705	8811
Total	77	2	6765	7198	7820	8085	8179	8501	9608	9873
Average No. of Books/Schools			86	91	99	102	103	107	121	125

* Magazines and other periodicals are also included.

In the year 1966, in the Panchayat Samiti schools under study, the average number of students and the books available in the school libraries worked out to be 74 and 125 per school respectively According to the American standard recommended in the year 1945 (Indian standard not known), the number of volumes in the schools under study should be about 740. This represents quite a contrast between what should be and what is It is also evident that yearly increase in the number of books is extremely limited.

In Table 10 some types of incentives provided to students in the rural primary schools are included The analysis shows that most of the schools (93·7 per cent) provide some light breakfast, mainly milk (powder milk supplied by CARE). In 86 per cent of the schools there is the tradition of providing

TABLE 10

Help and incentive to students

SCHOOLS	BREAKFAST	FREE READING MATERIALS	SCHOLARSHIPS	SCHOOLS WITH ALL BENEFITS
Running up to Class I	..	..	...	...
Running up to Class II	..	..	..	..
Running up to Class III	2	..	1	..
Running up to Class IV	5	5	5	5
Running up to Class V	67	63	40	17
Percentage	93·7	86·0	58·2	27·8

free books and other materials to deserving students. Scholarships (mainly provided by the Samaj Kalyan Vibhag) are being made available to 58 per cent of the schools. But only in 27·8 per cent of the schools are all the above three types of incentives provided to students.

TABLE 11

Assistance available for the improvement of school buildings for the year 1959

SCHOOLS	IMPROVEMENTS IN BUILDINGS AFTER 1959	FINANCIAL HELP BY PANCHAYAT SAMITI	FINANCIAL HELP BY VILLAGERS	HELP BY VILLAGERS IN KIND	SCHOOLS GETTING NO HELP
Running up to Class I	..	..	..		..
Running up to Class II	..	..	.	..	1
Running up to Class III	2	.	1	2	...
Running up to Class IV	6	5	5	6	2
Running up to Class V	36	30	25	13	32
Percentage	55·7	44·3	39·2	26·6	44·3

As is obvious from Table 11, after the year 1959, improvements have been made in 44 schools out of the total 79 under study. In 44·3 per cent of the schools, financial assistance was made available by the Panchayat Samiti, and in 39·2 per cent by the contribution of the villagers. Only 26·6 per cent schools enjoyed village help in terms of kind for improving the school buildings. Unfortunately, 44·3 per cent of the schools did not get any type of assistance from these sources.

Table 12 reveals the seating facility available for the students of various classes. It is seen from Table 12 that in the majority of schools, the stu-

TABLE 12

Seating facility for the students, class-wise

SCHOOLS	SEATING ON FLOOR		SEATING ON DURRIES		FURNITURE FOR STUDENTS	
	No. of Schools	*Percentage*	*No. of Schools*	*Percentage*	*No of, Schools*	*Percentage*
Running up to Class I	50	63·3	29	36·7	..	..
Running up to Class II	42	53·2	37	46·8	..	..
Running up to Class III	17	21·5	62	78·5	..	..
Running up to Class IV	10	12·6	69	87·4	..	..
Running up to Class V	6	7·6	72	91·1	1	1·3

dents studying in classes I and II are made to sit on the floor (63·3 per cent and 53·2 per cent respectively). In the higher classes (classes III to V), the students *sit on durries. It is very unfortunate that furniture is* not at *all* available for these students.

The position as regards the furniture made available for the school teachers and then their offices is not very encouraging either. In fact, each treatment must have at least one chair and one table, besides some benches, stools and almirahs.

TABLE 13

Furniture available for the staff and office

SCHOOLS	CHAIRS	TABLES	BENCHES AND STOOLS	ALMIRAH
Running up to Class I	..	..	.	..
Running up to Class II	1	1	..	..
Running up to Class III	1	1	..	..
Running up to Class IV	7	8	3	1
Running up to Class V	57	49	21	9
Percentage	83·5	74·7	30·4	12·6

The data in Table 13 shows that 16·5 per cent of the schools do not have even a single chair. Likewise, tables, benches, stools and almirahs are available in 74·7 per cent, 30·4 per cent and 12·6 per cent of the schools respectively. But even this furniture includes pieces which need repair.

Findings

The findings of this study are summarized below:

1. Out of the schools studied, the first school came into existence in 1917. Most of the others were opened during the last 15 to 20 years.

2. The over-all picture as regards the distance of a school from various important places and institutions appears to be satisfactory. However, 14 per cent of the schools in the Panchayat Samiti under study are situated about 10 miles away from the village bus stand. As for the post-office, 59·5 per cent of the schools are about five miles away, and 1·26 per cent are even 20 miles away.

3. Most of the schools (86·1 per cent) are running all the five primary classes; 10·2 per cent are running up to Class IV; 2·5 per cent up to Class III; and 1·2 per cent up to Class II.

4. The total enrolment in 1966 was 2·44 times the enrolment in 1959. In these eight years, there has been a definite trend towards gradual increase in enrolment.

5. Out of the total enrolment, 80 to 88 per cent is represented by the boys and about two to 12 per cent by the girls. There is no marked change in the enrolment of boys and girls during these eight years except that in 1966 the percentage of boys enrolled in the schools had dropped down to 66·7 per cent and the percentage of girls had gone up to 33·3 per cent.

6. The enrolment of boys and girls coming from scheduled castes and backward classes in 1966 was 2·84 times that in 1959. However, the proportionate increase in relation to the total enrolment from year to year has been more or less constant.

7. The strength of teaching staff has risen to 1·9 times what it was in 1959. The teacher-student ratio in 1959 was 1 : 29, whereas in 1966, the ratio was 1 : 37. Five to 10 per cent of the teachers are female. The non-teaching staff had gone up three times; the female non-teaching staff are gradually on the increase.

8. The ratio of non-teaching staff to teaching staff clearly indicates that the non-teaching staff has been greatly enhanced in recent years. For instance, in 1959, on an average, there was only one member of the non-teaching staff for about 12 teachers, whereas in 1966, the ratio was 1 : 3·5.

9. The student-teacher ratio in the majority of cases in these years has ranged from 26 : 1 to 40 : 1. To be specific, 73·4 per cent of the schools have a student-teacher ratio of 41 : 1 or below, and 26·6 per cent of the schools have a student-teacher ratio of 41 : 1 to 61 : 1 or above.

10. 41·6 per cent of the boys and 66·5 per cent of the girls of school are are not using the schooling facility in the villages. Out of the total school-going children in the Panchayat Samiti under study, only 49·7 per cent of the boys and girls are going to the schools.

11. Even though most of the schools have their own buildings, there is need for providing financial assistance to 13 (16·5 per cent) schools which so far do not have their buildings. Assistance is needed in almost all the schools for developing adequate accommodation.

12. The facilities for gardening are available only in a limited number of schools (39·2 per cent). Water and land both have been problems for many schools.

13. The programme and the facilities available for physical education, both in terms of playgrounds and sports and games equipment, are very inadequate in the schools. The same holds good for teaching aids, library facilities, furniture for staff and students, and the incentive provided to deserving students.

Implications

The following implications need to be considered in any attempt to improve conditions in rural primary schools.

1. Some schools (14 per cent) are 10 miles away from the bus stand while a large number of the schools are about 5 miles away from the post-office. When schools are shifted or new schools are opened, care should be taken to see that these distances are considerably shorter

2. The enrolment trend shows that no serious efforts have been made at any time for improving the student strength in the schools. The enrolment for girls continues to be poor. The total enrolment in schools represents only about 50 per cent of the children of school-going age—boys and girls. An organized effort, therefore, must be made in order to improve the enrolment. The enrolment for scheduled castes and backward classes also needs added attention.

3. There is an increasing trend for women teachers to serve in primary schools. This is a happy sign as women are considered to be more sympathetic and delicate in handling children at primary level. This trend should be further encouraged.

4. In a limited number of schools (26·6 per cent) the teacher-student ratio is relatively high This needs correction. In some schools this ratio is very low, and there care should be taken to increase the enrolment, so that the teachers and other school facilities are fully taken advantage of.

5. The findings reveal that facilities for buildings, library, games and sports, furniture and teaching aids are not adequate. This requires that more finances be made available for primary schools.

6. More scholarships and such other financial assistance should be provided to the students, so that potentially good but poor students can have the opportunity to further their education.

7. In an agrarian country like India, it is imperative that the rural schools possess adequate land and water for developing and maintaining a kitchen garden, a flower garden, etc. This will provide opportunities to the pupils to learn about scientific agriculture and production. Developing such understand-

ing and sensitivity among the younger generation is basic to the agricultural development and the rural prosperity of India.

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Bilingualism and Adjustment Difficulties

T. S. Rao

The study reported in this paper was undertaken to investigate two hypotheses regarding monocultural bilingual children: that they show relatively more problem behaviours than monoglots and to that extent are maladjusted; and that the degree of maladjustment is related to their second-language attainment. The sample comprised 226 children (age-group 6–10 years), with Kannada or Telugu as their mother-tongue, drawn from the first five classes of 30 primary Tamil-medium schools of Madras. Relevant information about the subjects was sought from the teachers through an inventory covering school situations and from the parents through another inventory covering home situations. For the first hypothesis, a control group of children with Tamil as their mother-tongue, matched for intelligence, was used. The second-language attainment of the sample was judged by measuring four language skills. The results supported the first hypothesis partially, and did not sustain the second.

A majority of the innumerable research investigations that have been undertaken in the area of bilingualism is concerned with the effect on mental development. One is struck, therefore, by the utter lack of well-planned studies on the effects of bilingualism on personality, and is apt to see the justice of Spoerl's (1943) remark that there have been many "speculative claims but little evidence" regarding the deleterious effects such as those mentioned by authors like Michaelis, Sander, Gali and Laurie (Weinrich, 1953). Since language and personality are very closely intertwined, it has been said that "inefficiency or inadequacy in speech implies as a necessary corollary an impaired adjustment (Seth and Guthrie, 1935). The bilingual child may be retarded in development in his own mother-tongue or in the second language or in both, and may reveal characteristics foreign to the particular language. He may not be proficient in the necessary skills such as vocabulary, etc. Added to this, he may be a bicultural which may give to him a marginal status. His feeling that he is not accepted by either of the language groups may lead to severe adjustment problems. This may be especially so in the years 6–10 when he is moving away from his secure family environment to the outside world where his peer group holds a key place. If he is deficient in the language of the school, this bilingualism may also lead to learning difficulties which again may lead to personality malfunctioning. This may take the form of strong inferiority feelings, withdrawal from the group and, sometimes, neurotic and even anti-social tendencies.

Hypotheses

The preceding discussion leads one to hypothesize a close connection of the adjustment problems of bilingual children with their second language attainments. The hypotheses that were laid down for investigation were:

1. The bilingual child shows relatively more problem behaviours than a monoglot, and to that extent, is maladjusted.
2. The degree of maladjustment is related to the second-language attainments.

These hypotheses were laid in the context of monocultural bilingualism where the two language groups belong almost to the same cultural stock and where the two languages have the same Dravidian roots. The first language is the language of the home and is learnt by the child with a fair amount of mastery, simultaneously with which the second language is picked up from the environment and is used also as the medium of learning in the school. Hence the two languages are acquired in separate but simultaneous contexts. Bilingualism of this type should also be called early bilingualism as the children are subjected to the influences of the two languages fairly early in their life.

Sample

Since the population set up to test the above two hypotheses belonged to the age-group 6–10 years and since the factors associated with learning in a different medium are assumed to contribute to adjustment difficulties, the sample was drawn from the first five grades of 30 primary Tamil-medium schools in the city of Madras. Two hundred and twenty-six children consisting of an equal number of boys and girls with Kannada or Telugu as their mother-tongue, were taken as the sample for the investigation. These children fell in the age-group of 6+ to 10+ years. The sample was a lower-middle-class sample in the main. Since the absolute language attainments of these children were not measured at any stage, the degree of second-language deficiency was not known. This varied from child to child depending upon the amount of stay in the second-language area, the grade in which they were studying and other factors.

Procedure

For the purpose of testing the first hypothesis, *viz.,* that bilingual children show relatively more behaviour problems than monoglots, the matched-group technique was adopted. Children whose mother-tongue was Tamil, and who were studying in the Tamil medium, were taken as the control group. An exactly equal number of boys and girls in each of the five age-groups formed the sample in the control group. These children were matched with the children in the experimental bilingual group not only for age, but also for economic status, educational level and the professional category of the parents. The groups were matched with respect to intelligence also, which was done using Raven's Progressive Matrices Care was also taken to see that such factors as change of school or living away from parents were also taken into consideration while matching the two groups.

Instruments

Because of the fact that most of the existing questionnaires or inventories for studying adjustments are not suitable for use at the lower age-levels (Cattel and Coan, 1959) and that self-ratings, peer ratings as well as projective tests do not work efficiently at this level, the adjustments of the children in this sample were studied through the assessments of teachers and parents. The indicators of adjustment difficulties observed in the classroom and home situations were selected in six broad categories: aggressive or anti-social behaviours, nervous habits, withdrawal behaviour, social skills and general feelings of inadequacy. These indicators covered the common patterns of maladjustive behaviours met with in the school and at home, and were included in two adjustment inventories. The first inventory consisted of indicators in the school situation, and the second one of indicators in the home situation. Items were selected in the first instance from the adjustment inventories available, but the final inventories consisted of only those items which discriminated a known maladjusted group from a well-adjusted group, the groups having been so nominated by a majority of the teachers in two try-out schools. The two final inventories consisted of 79 and 66 items respectively, including respectively seven and six check items. Each item was required to be answered with one of the three responses, 'often', 'sometimes' and 'never'. Two points were allotted for 'often', one point for 'sometimes', and zero for 'never'.

In addition to these items, both the questionnaires consisted of a section on personal data. Through this, information was sought regarding change of place, order of birth, speech difficulties, nervous habits, academic background, etc., of the child, and regarding the socio-economic status of the family.

The teachers' and parents' inventories thus consisted of items each of which was valid regarding its power to differentiate the maladjusted from the well-adjusted. In addition to this, the differences in the total scores for the items obtained between the two extreme groups in the case of both these inventories were significant at ·01 level. The inter-teacher reliability for the teachers' inventory was ·97 and split-half reliabilities for the parents' and teachers' inventories were ·57 and ·47 respectively.

Even though each of these two inventories could thus alone serve the purpose, the correlation coefficient of the scores on these two inventories for the 452 children in the experimental and control groups was only 0·22. This was to be expected, for, the teacher and the parents could have only a partial picture of the child's adjustment. Therefore, the scores got for each tendency in the two inventories were combined after giving weightage according to the method of principal components. The six weighted scores were again weighted following the same method. These six weighted tendency scores were added together to obtain the 'Maladjustment Scores' as discussed elsewhere (Rao, 1964).

Haugen (1965) has remarked that no generally recognized scale exists for measuring accomplishment in language, and even to this day, "a great lag exists in all foreign-language measurements". Moreover, several skills go to make up language proficiency, and it is not always possible to study each one of them. In the present investigation, four skills were chosen to study the bilingual children's proficiency in Tamil. These skills are: active basic vocabulary, ability to follow directions, power of comprehension, and general language maturity. Four tests in these skills formed the battery of tests employed to test the second hypothesis.

The Picture-vocabulary Test consisted of 64 words denoting professions, objects, edibles, actions, animals, parts of the body, parts of a house and nature-expressions which were within the range of at least 75 per cent of the Tamil children in the first two standards of primary school. These were to be presented in the form of illustrations mounted on cards of size 5½" × 3½". They were selected out of a preliminary try-out battery of 120 words administered to Tamil children of ages 6–8 years. Each correct response for the pictures gained a score of one and hence the maximum possible score was sixty-four. Split-half reliability of the test was ·72, as calculated from the main study results. Regular age-progression and sex differences in the scores for bilingual children in the main study were taken as evidence of the validity of the test (Mussen, 1960).

Since understanding what is said, and following directions are important skills necessary in daily life, a directions test was the second language test used in the present study. Some 40 directions were compiled in the preliminary form after taking into consideration the intelligence and maturation level of the subjects as well as the vocabulary of the directions. The responses to these directions were either in the form of one-word answers or simple actions according to the directions. These directions, mostly taken from the tests for the lower age-levels of the Binet-Simon and Kamat's Stanford—Revision intelligence tests, etc., were translated and re-worded into simple spoken Tamil as used in Madras City. The vocabulary was limited to the words within the comprehension of children in the lower standards. The average length of the sentences used was 4·2 words. The test battery was administered individually to each child. The time taken to give the correct response after the last word in the direction was uttered was also noted. Using Atkin's method of extreme groups, this battery was administered to 20 Kannada and Telugu children in the age-group 6–10 years in an Anglo-Indian school with varying Tamil handicaps, and to 20 Tamil children in the same classes. The method of discriminant function analysis was adopted to retain the 20 items that best discriminated between the two groups in terms of the frequency of correct responses and the average time taken for correct responses (Krishnan and Rao, 1964). The 20 items thus selected elicited a variety of responses, such as naming of colours, stating age, showing parts of the body, indicating the period of the day, naming animals, giving the ordinal numbers, etc. Four points were given for responses in less than one second, three points for 1–3 seconds, two points for 3–5 seconds, and one point for above 5 seconds. The maximum possible score was 80. The reliability was ·73, as calculated from the scores of the main bilingual group. Age-progression and sex differences in the scores were again considered as indicative of the validity of the test. The difference in means of the scores of the bilingual and Tamil groups of the preliminary try-out was significant at ·01 level.

The test devised to assess the oral comprehension skill consisted of two stories written in free-flowing Tamil. The first consisted of 15 sentences, all in the past tense. Most of them were simple sentences; only a few of them were complex. Some words of feeling, such as pride, anger, laughter, were also included. The second story was bigger than the first one and contained a number of complex sentences, but the vocabulary load was limited to the comprehension of the subjects in the age-group 6–10 years. Key questions, six for the first and eight for the second story, were framed. These two stories were recorded on an emitape tape at a standard speed of 1-7/8/4,75 on a Phillips tape-recorder. The stories were read out as if they were being told to an individual child, and the conversational style was adopted for this. Each story was followed by questions on it. These questions also were recorded on the tape. The tape was played individually to the children. After a preliminary administration to a few Tamil children, ten questions were retained in the final form. Each correct answer was given one point, so that the maximum score was ten. The reliability was ·86. The same considerations as in the case of the previous two tests indicated its validity.

A test in the form of a Story Telling Test was also used to cover other important indices of language growth, such as sentence construction, syntax, speed, pronunciation, etc. Children were asked to talk on some topic of interest to them or to tell stories which were tape-recorded. In the case of very young children, a set of attractive pictures was used to help them to come out with stories. These Tamil passages were transcribed exactly as they were given, in Tamil, retaining all errors, repetitions, etc. A set of rules was framed to transcribe redundancies, noises, gaps, etc.

Those concepts which have been found to really measure the maturity of language expression were used and hence the traditional method of analysing into grammatical categories such as parts of speech was given up. The method of scoring adopted was as follows:

	Maximum Score
Ratio of compound and complex sentences to total number of sentences (Multiplied by 20)	20
Type Token Ratio or the ratio of different words used to total number of word (Multiplied by 10)	10
Ratio of simple sentences to total number of sentencex (Multiplied by 10)	10
Average sentence length	10 (Theoretically not fixed)
Error Score	Minus score

'Other language' words, wrong inflection, wrong verb, agreement or usage, wrong tense form, redundancy, incomplete sentences, omission of suffixes, incomprehensible sentences, idiomatic errors, syntactical redundancy, not using pronouns or pointers where required, and omission of the conjunction were considered as errors. The ratio of the number of errors to the total number of words was the error score. This was subtracted from the total score.

The age-progression in scores noted in the main study indicates the validity of the test.

The scores in the four language tests were converted to standard scores ($SD = 10$, $M = 50$). The sum of the four standard scores was considered as the second-language attainment score.

The investigation was carried out in the 30 sample primary schools in the city of Madras, where the number of Kannada- and Telugu-speaking children was sufficiently large. All the bilingual children in the first five classes were selected. (The subjects for the control group were selected by selecting Tamil children matched for age, sex, approximate income of the father, etc.) The copies in English of the parents' questionnaire for the experimental group and the Tamil version of the same for the control group were filled in by the parents. The class-teachers filled in the teachers' questionnaire for all the children. Raven's Progressive Matrices Tests (coloured form) were administered to the two groups for matching for intelligence.

The language tests could be administered only to 118 bilingual children in ten schools due to non-availability of facilities in the rest of the schools. The Picture-Vocabulary Test and Directions Test were administered in the first session, and the other two tests requiring the use of a tape-recorder were administered in the second session. Each session lasted about 20 minutes.

Analysis of results and conclusions

The information supplied by the parents and teachers in the Personal Data Sheet part of the questionnaires revealed that the number of detentions was more in the case of bilingual girls than for Tamil girls and that the Tamil-group girls got more prizes than bilingual girls. The teachers also rated the control girls higher in academic standing than the bilingual girls. Thus the bilingual girls show poor academic achievements in comparison with Tamil girls. This difference is not found in the case of bilingual and Tamil boys. This leads to the conclusion that bilingualism has a deleterious effect on academic adjustments in the case of girls.

The Personal Data information did not reveal much about nervous habits such as thumb-sucking, chewing, difficulty in paying attention, etc. There was no difference between the two groups in the frequency of the incidents reported. However, the incidence of stuttering in bilingual boys is greater than in Tamil boys, and this is significant at ·02 level. The speech of bilingual children is rated as indistinct by the teachers. Bilingual boys are also reported to experience difficulty in finding words. Bilingual girls are as good as Tamil girls in speech.

The maladjustment scores were analysed using the three-way analysis of variance. The mean maladjustment scores for the various groups are given in Table 1, and the results of analysis of variance, are given in Table 2.

TABLE 1

Means of maladjustment scores

AGE	EXPERIMENTAL			CONTROL			TOTAL	BOYS	GIRLS
	Boys	*Girls*	*Total*	*Boys*	*Girls*	*Total*			
6	71·45	72·87	72·16	72·06	54·54	63·30	67·73	71·76	63·71
	19	19	38	19	19	38	76	38	38
7	68·13	68·59	68·39	75·77	52·08	62·08	65·24	71·95	60·34
	19	26	45	19	26	45	90	38	52
8	50 44	57·33	54·71	61·18	54·30	56 91	55·81	55·81	55·82
	19	31	50	19	31	50	100	38	62
9	70·24	72·66	71·21	58·63	53·19	56·43	63 82	64·43	62·93
	31	21	52	31	21	52	104	62	42
10	65·94	67·07	66·38	69·26	56·44	64·26	65·32	67·60	61·75
	25	16	41	25	16	41	82	50	32
Total	65·81	66·76	66·28	66 55	53·93	60·24	63·26	60·10	60·34
	113	113	226	113	113	226	452	226	226

TABLE 2

Analysis of variance of maladjustment scores

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F
Group	1	5387·47	5387·47	4·79*
Sex	1	5186·59	5186·59	4 61*
Age	4	6605·42	1651·36	1·47
Group and Sex	1	4340·53	4340 53	3 86*
Group and Age	4	3374·80	843·70	<1
Sex and Age	4	1·64	0·41	<1
Group, Sex and Age	4	3390·24	847 50	<1
Error	432	485754·39	1124·43	

	E	C	E–C	E–C
	B–G	B–G	Boys	Girls
df	224	224	224	224
t	·21	2·91**	0·14	2·80*

* Significant at ·05 level.
** Significant at ·01 level.

It is seen from Table 1 that the mean maladjustment scores for the experimental (bilingual) group is higher than that for the control (monolingual) group. This difference being significant at ·05 level, it can be said that the bilingual children in this sample show more adjustment difficulties than the monolingual children.

Further observation reveals that this difference in maladjustment scores between the two groups is due to the difference in the scores of the girls in the two groups. The difference in scores between the girls in the experimental and control groups is significant at 0·01 level. Only the bilingual girls, and not the bilingual boys, show adjustment difficulties. Hence the first hypothesis has to be accepted only partially, and has to be re-worded thus:

> Bilingual girls show more behaviour problems than monolingual girls, and to that extent they are maladjusted.

A snap study with a small sample of bilingual and monolingual children studying in English-medium schools revealed that even when both were studying in the same medium, which is a foreign language to both the groups, the bilingual children showed more adjustment difficulties This suggests that this maladjustment is not associated with school bilingualism.

The second hypothesis that was formulated was that the maladjustment arises from a second-language deficiency. The maladjustment scores should show high negative correlation with second-language attainment scores to sustain this hypothesis. However, the correlation coefficient was only ·04—which was low and quite negligible. Therefore, the second hypothesis that maladjustment is related to second-language deficiencies does not seem to be sustained by this study.

It is also significant to note that the bilingual girls were superior to boys in language and that the differences in the means of language-attainment scores between boys and girls was significant at ·01 level.

Thus, bilingual girls, though they are superior in the second-language to bilingual boys, have adjustment difficulties. This extends to the academic field also, and they fare badly in comparison with control girls. Since this maladjustment is not related to the attainments in the second-language, we can only say that bilingualism effects in some way the adjustment of girls. Perhaps this maladjustment has its roots in attainments in the first-language itself, but this only further research can tell.

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Developmental Norms of Children Aged 2½–5 years: A Pilot Study[1]

Rajalakshmi Muralidharan

This pilot study was undertaken on a sample of 38 children in the age-group 2½–5 years, drawn from ten nursery schools of New Delhi, to trace the pattern of child development during these years. Other objects were: (i) to develop, modify and adapt to Indian conditions the testing equipment in Gesell's Developmental Schedule in the fields of motor, adaptive, language and personal-social development; (ii) to develop observational record blanks for all the tests included in this study; (iii) to develop standard procedures for administering the different tests. In this paper the author describes, in detail, how the above objectives were pursued.

Though developmental processes follow a consistent course, environmental variables do make an impact upon the pattern of child development. For instance, absence of stimulation from the environment, poor health, malnutrition, or lack of incentive from adults may retard the normal rate of development. Climatic conditions, social values, and customs and traditions also influence the developmental pattern of the child. Thus it is obvious that the developmental patterns of children of different cultures are not comparable and that the data obtained from elsewhere cannot be applied to understand the children of India. The present project was therefore undertaken to elicit this much-needed basic data on child development in India. Such data should pave the way for major changes in education, for example, in curriculum planning.

It was proposed to start the present project from the age of 2½ years as it is at this age that the child is first exposed to schooling. An organized agency like the pre-school can reach the child at this age and stimulate his development by means of an enriched school programme. The rate of development, particularly intellectual development, is extremely rapid during this stage and the child derives the maximum benefit if stimulation is given at this stage. Moreover, it is on this stage that the entire schooling programme is based.

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[1] This study was conducted by the author at the Department of Psychological Foundations, National Institute of Education, under the guidance of Shib K. Mitra. The project staff consisted of Nalini Singhal, P. D. Khera, R. Prasad and Raj Abrol.

On examining the various studies in this field, it was felt that what was needed in the beginning in India was a study which would tell us about the pattern of child development, and not a study which arrived at a quantitative index of growth. It was decided to adopt Gesell's Developmental Schedules[1] for the proposed study, for the following reasons:

1 Gesell's developmental studies are continuous, covering the period from early infancy to adolescence.
2. The Gesell approach is development-oriented and considers every child unique is his/her developmental history. It does not score behaviour as right or wrong but takes the developmental pattern as a unit.
3 Gesell's schedules were found to be the most comprehensive of all scales, and they cover all aspects of development.

In order to adapt Gesell's Developmental Schedules to Indian conditions, the present pilot study was conducted on a sample of the nursery-school-going population of Delhi in 1963–64. The study has the following three objectives:

1 To develop, modify, and adapt the testing equipment used in Gesell's Developmental Schedule, in the field of motor, adaptive, language and personal-social development.
2 To develop elaborate, exhaustive, observational record blanks for all the tests included in the study so as to ensure objectivity in observations.
3. To develop standard procedures for administering different tests in order to maintain uniformity in the testing done by different field workers.

The sample

The sample consisted of 38 nursery-school-going children in the age-group 2½–5 years. The detailed break-up of the sample is as under:

Ages	*Boys*	*Girls*
2½	5	4
3	5	4
4	5	5
5	5	5
	20	18

Total = 38

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[1] A. Gesell, *The First Five Years of Life.* London; Methuen & Co., Ltd., 1940.

The testing programme was confined to ten nursery schools covering different fee-groups. After drawing up a list of the schools in New Delhi, these were classified into three types according to the fee they charged: high, low and middle. Three schools each were selected from the high- and low-fee types and four from the middle-fee type. The fee charged by the school was found to be a fairly good indicator of the socio-economic status of children, and thus it enabled us to get a representative sample of children.

The developmental aspects studied

The developmental aspects studied were:

A. Adaptive development,
B. Language development,
C. Motor development,
D. Personal-social development.

A ADAPTIVE DEVELOPMENT

Adaptive development stands for those activities which a child is able to perform by virtue of his maturation at a particular time in his growth, without specific training of these. The knowledge or awareness of these is intrinsically associated with his growth processes though the stage or time of its unfolding is a function of his environment. Gesell has defined adaptive development as "a convenient category for those varied adjustments, perceptual, orientational, manual, and verbal, which reflect the child's capacity to initiate new experiences and to profit by past experience."

The following are some of the tests used to test adaptive development.

I. Cube Play,
II. Form Discrimination,
III. Drawing,
IV. Number Concept,
V. Immediate Memory,
VI. Comparative Judgment.

All these tests have been included in Gesell's schedules also. However, since the tests had to be administered by a large number of workers in the proposed major study, it was found necessary to develop detailed observation schedules for each of the test items. The observations made during the present study were therefore used to break the tests into various elements so that the observations are made more objective. Take, for instance, Spontaneous Cube Play. It is broken into three elements, such as: (1) interest taken in block play; (2) nature of the structure constructed; (3) accuracy in the place-

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ment of cubes. Each of these elements is further divided into smaller units. For instance, 'interest taken in block play' is itemized into: (1) leaves the table; (2) merely sits without playing; (3) scatters or throws cubes; (4) shows interest, (5) plays spontaneously; (6) indulges in constructive cube play. Such observation schedules are drawn up for all the test items. It is hoped that such itemization makes the observations more objective.

I. CUBE PLAY

Block-building activities fascinate young children and this interest increases with the increase in age. Cube play involves the use of ten cubes and contains the following six tests:

a. Spontaneous cube play
b. Tower-building,
c. Train-making,
d. Bridge construction,
e. Gate-making,
f. Step construction.

These tests are graded according to their difficulty level in perception, conceptualization and the finer muscular skill in handling the cubes.

The cube play tests are started with spontaneous cube-play. Ten cubes of 1" × 1" × 1" size are presented to children, nine forming a square and the tenth kept on top in the middle of the square. The children are left free to play with them in any way they like. If they do not play spontaneously, they are encouraged to do so by the tester. Thus, after enlisting their cooperation, the cube construction tests are started.

Models of a tower and a train are built in front of the child and the child has only to imitate them. If he succeeds in making the train, he is asked to copy the bridge, gate and steps. But if he is unsuccessful in making the train, the bridge and gate are made in front of him, and he is asked to imitate. The only exception is 'steps' where, though the process is the same, he has to depend on his visual memory.

Besides observing the behaviour that leads to the construction of the models or their varying patterns or forms, an attempt was also made to understand the motor skills involved in the construction of these models.

Summary and analysis of cube play

Table 1 gives the behaviour patterns of children in cube play series. It shows that if over 50 per cent is taken as the cut-off point, only children at the age of four years are able to make a tower of ten cubes with ease, after which tower-making ceases to discriminate between ages.

TABLE 1

Percentages of children in terms of their behaviour in cube play series

AGE	TOWER BUILDING			TRAIN-MAKING				BRIDGE-MAKING			GATE-MAKING			STEPS CONSTRUCTION		
	Unable to do	*Made smaller tower*	*Made a complete tower*	*Copied*	*Made row only*	*Copied without pushing*	*Unable to do*	*Copied*	*Imitated*	*Unable to do*	*Copied*	*Imitated*	*Unable to do*	*Copied*	*Imitated*	*Unable to do*
2½+yrs.	56·5	..	44·4	22·2	55·5	11·1	11·1	22·2	22·02	55·5	..	..	100	..	..	100
3 +yrs.	22·2	33·3	44·4	44·4	33·3	22·2	..	44·4	22·2	33·3	44·4	22·2	33·3	..	..	100
4 +yrs.	..	..	100	20	30	50	..	50	30	20	50	20	30	10	..	90
5 +yrs.	..	..	100	50	20	30	..	90	10	..	50	10	40	30	..	70

The concept of 'train' grows gradually. The 2½-year-old child cannot even copy the structure as 55·5 per cent children place the cubes in a row only. This is reduced to 20 per cent at 5+. The structure is clear at 3+ but the complete act of copying, including pushing the train, comes at 5+, when 50 per cent were able to do it. The percentage of children completely copying the act goes down at the age 4+, though it rises again at 5+. As against this, Gesell reported the success of 96 per cent of the children at age 3 years, though at age 2 years the percentage of success was only 15 per cent.

In Gesell's study 35 per cent children were able to copy the bridge at 3+ and 100 per cent at 4+ whereas in the present study 44·4 per cent were able to copy at 3+ years and 50 per cent at 4+ years. Copying the bridge also shows a gradual rise in ability from 22·2 per cent at age 2½+ to 90 per cent at age 5+.

In gate-making, which is relatively a difficult task, Gesell's study indicated changes at 5+ years when the percentage of children who were able to copy rose at 3+ years from 3 per cent to 75 per cent. They, however, did not achieve cent per cent mastery even at 6 years of age. In the present study, the percentage of children succeeding in copying does not change much in the age-range 3+ to 5+ years and is 50 per cent. This implies that changes in the perceptual understanding of the gate structure do not occur in this age-group in Indian children.

Table 2 gives sequential success of children in the entire series without encountering a single failure. This table is valuable in terms of predictability. For a five-year-old child, the level of difficulty in copying the train and the bridge is the same. Thus all those succeeding in copying a train are likely to succeed in copying the bridge as well, whereas only 40 per cent of them are likely to succeed in copying the bridge and 30 per cent in constructing the steps The case of four-year-old children is different. Of those who succeed in tower-making, only one-fifth are likely to succeed in copying a gate.

TABLE 2

Percentages of children giving sequential success without failure

AGE	TOWER-BUILDING	TRAIN-MAKING	BRIDGE-MAKING	GATE-MAKING	STEP CONSTRUCTION
2½+ years	44	22	..	..	..
3 + years	44	11	..	..	..
4 + years	100	70	30	20	..
5 + years	100	70	70	40	30

II. FORM DISCRIMINATION

The Form Discrimination tests measure the ability of children to discriminate between different basic forms, like the circle, triangle, and square and a set of graded complicated forms. In some the child has to insert forms in appropriate holes and in others he has to identify a particular form set amongst an array of forms The tests aim to study the growth of recognition from simple to complex relationship in form, direction and inclination.

The following tests are included in the series:

a. Three-Hole Form Board,
b. Goddard Form Board,
c. Colour Form,
d. Kuhlmann-Terman Geometric Form Recognition Test.

II a. (i) Three-Hole Form Board

Mode of presentation · Gesell's Three-Hole Form Board consists of three basic geometric forms, the circle, the square and the triangle, painted attractively white. These blocks are to be inserted in the corresponding holes in a green board. Before the test proper, the child is at first attuned to the problem by getting him to insert the circle so that he gets to know the problem as well as the rotation of the board. Then the test is administered by placing the board on a table in front of the child keeping the circle on his right and with the apex of the triangle pointing away from him. After this, the board is rotated by 180° and administered again.

II b. Goddard Form Board

The Goddard Form Board consists of ten geometric forms including those in the Three-Hole Form Board. It is a test for recognizing more complicated forms involving multiplicity in the number of sides, peculiarity of angles, and odd shapes. Unless the ability to recognize forms is well developed in the child, it is not possible for him to succeed in the test with speed.

Mode of presentation: All the blocks are placed on a table to the right of the child in three piles and the Board is kept in front of the child. In each of the three piles of blocks, the star, the lozenge and elongated hexagon are placed at the bottom.

II c. Colour Forms

Mode of presentation: Five forms in bright red are printed on white paper. Identical cut-out colour forms are shown to the child who locates the parallel form on the paper board by pointing his finger. This test is also meant to act as an introduction to the Kuhlmann-Terman Geometric Form Recognition Test. The forms included in the test are the disc, half-disc, square, cross and triangle.

II d. Kuhlmann-Terman Geometric Form

The Kuhlmann-Terman Geometric Form Recognition Test consists of ten complicated geometrical forms drawn on a small sheet of thick paper, and cut-outs of identical forms. The forms drawn are almost in miniature and are about one-tenth the size of Colour Forms.

Mode of presentation· The sheet is placed in front of the child. Then the cut-outs are placed before him, one by one, and he is asked to find out the parallel form from the sheet and place the cut-out on it.

Table 3 gives average time in seconds taken by children in different Form Discrimination tests. Time given in bracket has been reported by Gesell.

TABLE 3

Average time taken in form tests

AGE	TIME (IN SECONDS)			
	Three-Hole Form Board	*Three-Hole Form Board*	*Goddard Form Board*	*Kuhlmann Terman Form Recognition*
2½+ years	16·8	22·8 (44)	115·1	.
3 + years	12·5	15·7 (25)	76·1 (96)	110·4
4 + years	10·5	11·0	48·7 (55)	111·0
5 + years	7·6	8·6	39·1 (34)	56·6

Age trends

The 2½-year-old succeeds in the Three-Hole Form Board but his recognition is yet not clear. He is still at the hit-or-miss stage. Still more difficult is the case when the board is rotated, and the time then taken is considerably high. Being conditioned to the unrotated board, he invariably puts, at least at first, the circle in the square hole. He also takes time to understand how to adjust the apex of the triangle. He tries to force the block in the hole. But he is able to do the test in less than 25 seconds.

On the Goddard Form Board, the two-and-a-half-year-old seldom corrects an error once committed. Over 40 per cent find it difficult to insert the hexagon, diamond, star and cross.

The Colour Form Test is easily done by the children of all age-groups, right from 2½ years onwards. But the 2½-year-old finds it extremely difficult to manipulate or identify the Kuhlmann-Terman forms.

The 3-year-old is able to do the Three-Hole Form Board without much difficulty, though his adaptability to rotation is not yet complete. His growing awareness makes him realize his error and he thus hastens to correct himself. He takes, on an average, 15 seconds to complete the task. He does recognize forms in the Goddard Form Board and is inclined to pick out the familiar ones. However, the star, diamond and cross continue to be difficult to recognize. He takes 76 seconds to complete this test.

The 3-year-old is not yet at ease with Kuhlmann-Terman Forms. Over 50 per cent of the children are unable to do this test. Others find the octagon, trapizium and cylindrical shapes difficult to recognize.

The 4-year-olds and 5-year-olds do the Three-Hole Form Board with ease and without any difficulty. They having perceived forms are well adapted to the rotated board. The time in the two tests do not vary; this proves that in difficulty level these tests are equal. The 4-year-olds take 11 seconds and 5-year-olds, 8 seconds.

Children at these age-levels are also able to do the Goddard Form Board with ease though 30 per cent children still find the diamond form difficult. The time taken by 4-year-olds is 48·7 seconds and by 5-year-olds, 39·1 seconds. In the Kuhlmann-Terman Test, 50 per cent of the 4-year-olds do not succeed, but at 5+ years, all do it with ease.

III. DRAWING

The ability to hold a pencil, brush or crayon properly is an essential prerequisite of writing readiness. Gesell considers the ability to draw and write second in importance only to oral language for the advancement of the race and the individual.

The following tests are included in the series:

a. Spontaneous Drawing,
b. Draw-a-Man,
c. Incomplete Man,
d. Imitative Drawing,
e. Copy of Forms.

III. a. Spontaneous Drawing

Mode of Presentation: The child is given a drawing sheet and a thick red pencil and is asked to draw whatever he desires. Many children ask, "What should I draw?" but the examiner maintains that the child should draw whatever he likes to.

III b. Draw-a-Man Test

Mode of presentation. Immediately after the spontaneous drawing, when the child is at home in the drawing activity, he is presented with another sheet of drawing paper and asked to draw a man Many children are still likely to say that they do not know how to draw a man but the child is persuaded to draw in the way he feels he can.

III c. Incomplete Man Test

Mode of presentation: The child is shown the drawing of an incomplete man and he is asked to identify it. After this he is told that this drawing has been left incomplete by some one and that he should complete this. If he fails to respond, he is told, "Look, there is only one ear; please draw the other one," and so on. This test does not follow the Draw-a-Man Test so that practice effects, if any, are avoided.

III d. Imitative Drawings

This includes imitation of vertical, horizontal and circular lines, and the cross. The examiner first attracts the child's attention Then he draws a vertical line and a horizontal line, one after the other, and requests the child to draw the line in the same way and of the same size on the same sheet of paper.

III e. Copy of Forms

Copy of Forms Test includes copying of a cross, circle, square, triangle, diamond and rectangle with diagonals and mid-point lines.

Mode of presentation: The child is shown the geometrical form drawn on a paper and is asked to draw a similar form on a drawing sheet of the same size presented to him.

Analysis and discussion

In Spontaneous Drawing, children at the ages of 4 and 5 draw a variety of objects, though the drawings are mostly centred around familiar objects like animals and birds. At the ages of 2½ and 3 years, the children tend to scribble, though at the age of 3 the attempt to make meaningful objects is found to begin.

Table 4 below gives the results.

TABLE 4

Age	*Percentage of children who scribble*	*Percentage of children who make meaningful objects*
2½+ years	100	..
3 + years	60	40
4 + years	..	100
5 + years	..	100

In the Draw-a-Man Test too, the 2½-year-olds only scribble and cannot draw a man The 3-year-olds make an attempt to draw a man. They draw a partial, yet, recognizable man though with unproportionate features. More than 50 per cent of the children draw the head, eyes, legs and mouth, and 50 per cent of the children also draw the body, arms, fingers, ears and neck. The 4-year-olds and 5-year-olds are able to draw a distinctly identifiable and more proportionate man and include all the important features. More than 50 per cent of the 4-year-olds draw the head, eyes, legs, mouth, nose, body, feet, fingers and ears. Just 50 per cent draw arms. At the 5-year-level, the difference that is observed between this age and the 4-year-level is that at the 5-year-level the body, feet and ears are not characteristically drawn. (Only 40 per cent of the children draw them.) But the percentage of children drawing arms increases from 50 per cent at the 4-year-level to 70 per cent at the 5-year-level. Similarly, hands also emerge at this stage; 60 per cent of the children draw them.

Taking over 50 per cent as the cut-off point, the parts drawn by the children at different age-levels are as follows:

Age	*Parts drawn*
2½+ years	Nil
3 + years	Head, eyes, legs, mouth, nose
4 + years	Head, eyes, legs, mouth, nose, body, feet, fingers and ears
5 + years	Head, eyes, legs, mouth, nose arms, hands and fingers

In the Incomplete Man Test, taking over 50 per cent as the cut-off point, the following features were completed by children at different age-levels.

Age	*Features completed*
2½+ years	Nil
3 + years	Leg, arm, eye
4 + years	Leg, arm, eye and ear
5 + years	Leg, arms, eye, ear, fingers, foot

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Gesell found in his sample that 46 per cent of the children at 3 years did not respond. The leg, arm and eye which were completed at 3 years in the present study were completed only at 4 years in Gesell's Study. At 5 years, the results are nearly equal.

In Imitative Drawings, taking over 50 per cent as the cut-off point, the success at different age-levels is as given below:

Age	*Drawings imitated*
2½ years	Vertical line, horizontal line
3 to 5 years	All drawings

Gesell administered this test only up to 3 years. In the present study, it was found that although children are able to do it at 3 years, they differ more with respect to the direction and size of drawings. It was therefore decided that the subsequent study should keep a record of these variables.

In Copy of Forms, taking over 50 per cent as the cut-off point, the success at different age-levels is as given below:

Age	*Drawings copied*
2½ and 3 years	Nil
4 and 5 years	Triangle,square

The other forms could not be copied by the children in the age-groups under study. Gesell reported in his study that the ability to copy any of the forms (taking over 50 per cent as the cut-off point) emerges only at 6 years whereas the present study indicated that children at ages 4 and 5 years are able to copy the square and the triangle. As in the case of Imitative Drawings, in Copy of Forms too it was decided that future studies should take into consideration also the size and direction of the drawings.

Age trends

The 2½-year-old child predominantly scribbles. His hold on the pencil is still not firm. He identifies the incomplete man as a man or a boy but is not able to complete any features of the drawing. He can imitate a vertical line and a horizontal line and, to a certain extent, a circular line (only 44 per cent) but not the cross. He is not yet in a position to copy any of the geometrical forms.

The 3-year-old child does scribble still, but he also attempts to draw meaningful objects. In the Draw-a-Man Test the common features he draws are the head, eyes, legs, mouth and nose. He is also able to complete the leg, arm and eyes in the Incomplete Man Test. He is able to imitate all the drawings but is unable to copy any of the forms.

The 4-year-olds and 5-year-olds are much better in drawing ability. Their drawings are distinct, though the concept of proportion comes only at age five years. In the Draw-a-Man Test, they draw all the important features. They clothe the child in the Incomplete Man Test, and complete all essential features. They are able to imitate all the drawings and copy well the figures of a triangle and a square.

NUMBER CONCEPT

The following tests were included for understanding the concept of number in children:

1. Coin Identification,
2. Counting Objects: counting of objects up to 16,
3. Counting Fingers: concept of the number of fingers on both hands,
4. Addition: adding up to 5,
5. Subtraction: subtracting within 5,
6. Drawing of Marbles: drawing marbles up to 5 in different directions.

Coin Identification

Mode of presentation: Children are shown coins of the value of 1 paisa, 5 paise, 25 paise and 50 paise and currency notes of the value 1 rupee, 5 rupees and ten rupees, and are asked to identify them one by one.

Counting Objects

Mode of presentation: Sixteen one-paisa coins are spread on the table in a line and the children are requested to count the coins on the table one by one.

Counting Fingers

Mode of presentation: Children are asked questions like: "How many fingers do you have on one hand?" and "How many fingers do you have on two hands?"

Addition

The task of counting is presented to children by making examples of concrete objects such as toffees, pencils and so on. The total counting is within 5 and consists of five sequences: 2+ 1; 1+ 1;
4+ 1; 2+ 2;
3+ 2.

Subtraction

Mode of presentation: Subtraction, like addition, is done through examples using concrete objects. The total units do not increase over 5 : 4–2 ; 3–1 ; 5–2; 2–1 ; 3–2.

Drawing of Marbles

Mode of presentation: A drawing of a child playing with marbles is presented to the child. After this, he is asked to draw one marble at the bottom, two at the top, three in front and one at the back of the picture of the child. The test aims to understand the child's understanding of number and direction.

Immediate Memory

Mode of presentation: This is a simple test of recall of numbers spoken to a child in sets of two, three, four and five. The sets are non-sequential. There are three sets for every pair.

The following pairs are included in the test:

Stage I: 7–2, 5–9, 4–1
Stage II: 4–6–1, 2–7–3, 5–2–8
Stage III: 3–9–2–6, 1–5–8–3, 4–7–9–2
Stage IV: 6–2–7–9–1, 7–1–4–5–2, 5–3–7–8–6

Comparative Judgment

Under the Comparative Judgment Test are included tests that measure perceptual discrimination, though this test is culturally determined when related to comparative aesthetic judgment.

The tests included were as under:

a. Comparison of lines,
b. Comparison of weights,
c. Aesthetic comparison.

Comparison of Lines

Mode of presentation: This consists of the original Biner-Simon Test of presenting to the child two lines drawn on the same card. The child is requested to point out the bigger and the smaller lines. The card is presented in a random way every time.

Comparison of Weights

This test assesses the ability to discriminate between weights of the dimension of 6, 9, 12, 15 and 18 grams.

The test is presented in the following two forms:

a. Two block tests—weights 3 and 15 gm.

b. Five block tests—weights 3, 6, 9, 12, 15 gm.

The test expects the child to serialize the five weights in the second test.

Aesthetic Comparison

This was an Indian adaptation of the Binet-Simon Test on aesthetic comparison. The test did work though it was found not to be adequately aesthetic.

Analysis and Discussion

Table 5 gives the percentage of children who were able to do the number tests. If over 50 per cent is taken as the cut-off point for all the number tests, even the 5-year-olds are not found to have much understanding of numbers. One can however say that from the age of four years onward, children start developing some understanding of numbers Gesell also reported that the 5-year-olds err in counting, in number of fingers and in drawing bubbles and that this ability comes adequately at 6 years.

TABLE 5

Percentage of children who were able to do the number tests

Age	*Can count objects fingers add and subtract and do marble test*	*Can count objects fingers add and subtract*	*Can either add or subtract*	*Can add or subtract at least two items out of five*	*Can Count only fingers and objects*	*Can count and add only*	*Unable to do*
5 + years	40	20	10	30	..	..	..
4 + years	30	20	40	..	..	..	10
3 + years	..	..	..	..	33·3	22·2	44·4
2½+ years	..	..	..	..	..	..	100

In digit repetition, it was found that the Indian child fares much better. He is able to repeat four digits at 4 years which Gesell reported at 4½ years.

In comparison of lines, it was found that this test does not discriminate beyond 3 years. Gesell, too, reported similar results, and he found that 4-year-old child makes no error in this. In order to make the comparison of lines effective, it was decided that subsequent studies should design this test in the following manner:

- *a.* Comparison of lines should be graded and the test enlarged to cover five lines,
- *b.* The lines should be drawn on different sheets, and
- *c.* The comparison should be graded between: (i) two lines, (ii) three lines, and (iii) five lines.

Similar suggestions were also made with regard to comparison of weights; weights should be compared in three stages instead of two as suggested by Gesell.

Children were able to discriminate between weights 3 and 15 grams but they found it difficult to serialize five weights. Only 20 per cent of the children at 5 years were able to do this.

Other modifications in the adaptive tests

It was suggested that for subsequent studies the Aesthetic Comparison Test be adequately modified to suit our cultural background for subsequent studies.

B. LANGUAGE DEVELOPMENT

Description of tests and analysis of results

Acquisition of language is vital to the development of the young child. This is what helps the child to comprehend, to understand and to communicate with the outside world. This process is continuous and results in the broadening of his vision and the deepening of his knowledge. At early stages, language primarily serves to fulfil his emotional, intellectual and personal-social needs.

The pre-school child at 2½ years has acquired this ability only recently and is thus very enthusiastic to make use of it in narrating his experiences, real or imaginary. Experimentation with language is a novel and challenging task for him.

This section is an inquiry into the structure of the child's thought, his comprehension of day-to-day terms, his development from the concrete and the specific to the abstract and the general, and his concept of time, and, finally, his concept of self. The following tests, used by Gesell, were employed in the testing programme:

- *a.* Action Agent Test,
- *b.* Comprehension Test,
- *c.* Concepts of Name, Age, Address and Time.

A. ACTION AGENT TEST

This test consists of 19 action-stimulus words. The child has to discover the specific agent for these stimulus words. Most of the action words chosen are such that they easily lend themselves to multiple usage and elicit responses according to home conditions and/or individual experiences. Most of the terms are of daily use and are not alien to children. The following words were used in the test:

What sleeps	What walks
What flies	What barks
What bites	What eats
What swims	What cleans
What burns	What speaks
What cuts	What falls
What boils	What laughs
What roars	What grows
What mews	What blooms
	What writes

The nine stimulus words in the left-hand column are the same as those given by Gesell. The remaining words used by Gesell were either not so familiar in our cultural set-up or were difficult to translate, and were therefore replaced by the words given in the right-hand column.

Scoring

All the replies were recorded verbatim. Wherever the object or the agent was given correctly it was taken as a correct response and given the score 'one'.

TABLE 6

Analysis of the responses to the Action Agent Test by 2½, 3, 4 and 5-year-old children

	AGE IN YEARS			
	2½+	3+	4+	5+
Percentage of simple correct responses	57·31	70·17 (33)*	76·31 (56)	84·73 (73)
Percentage of multiple responses	4·08	14·16 (1)	7·43 (5)	13·03 (2)
Percentage of simple incorrect responses	15·20	15·78 (8)	10·52 (10)	7·36 (9)
Percentage of 'don't know' responses	2·33	1·75 (6)	0 52 (11)	1·05 (5)
Percentage of no responses	23·98	11·11 (11)	11·57 (2)	5·78 (2,
Percentage of 'I' responses	57·43	16·66	7·14	10·05
Percentage of 'we' responses	5·88	17·64	58·82	17·64
Number of average responses per child	9·08	12·0	14·5	16·05

* Figures in brackets give results published by Gesell.

Comparing the results of the present study with those published by Gesell (given in brackets in Table 6) it is observed that in the present study the percentage of simple correct responses increases gradually from 57·31 per cent at 2½+ years to 84·73 per cent at 5+ years. The increase in the interval from 3+ years to 4+ years is relatively low (only six per cent) whereas Gesell reported a steep rise from 33 per cent at 3+ years to 73 per cent at 5+ years (which is more than double). However, the percentage of correct responses in the present study is higher than in Gesell's results at all ages; there is a difference of over ten per cent at 5+ years.

The percentage of multiple responses given by the children in the pilot study are not steady; neither is this so in Gesell's study. In the present study, the multiple responses rose from 4·48 per cent at 2½+ years to 14·16 per cent at 3+ years; they fell steeply down to 7·43 per cent at 4+ years and rose again at 5+ years to 13·5 per cent. Thus multiple responses show fluctuating tendencies. The highest percentage at 3+ years is about three times that reported by Gesell at 4+ years. Thus, along with a high rate of correct responses, the percentages of multiple responses are also higher, but both show fluctuating trends. The spurt that Indian children show at 3+ years has been shown in Gesell's study at 4+ years.

Summary analysis of the responses to the Action Agent Test by 2½, 3, 4, and 5-year-old children

GENETIC SEQUENCE

Age	*Pattern*
2½+ years	About nine correct responses; personal references to the child himself ('I responses') predominate; one in every six responses is incorrect; child give no response to every fourth word.
3 + years	About twelve correct responses; family responses predominate; half the children give multiple response; one in every six responses is incorrect; child gives no response to every nine response.
4 + years	About fourteen correct responses. Responses have become more generalized though the predominant response is still the family. Personal responses occur occasionally; one in every tenth response is incorrect; child gives no response to every nine response.
5 + years ..	About sixteen correct responses. Abstract, social and general responses emerge, such as children, all, women, men. Multiple response frequent. Few incorrect responses (one in every fifteen). 'No response' structure is rare.

The percentage of incorrect responses decreases gradually from 15·20 per cent at 5½ years to 7·36 per cent at 5 + years although it increases slightly at 3+ years Gesell's study did not show any decreasing trend in incorrect responses and the percentages remained more or less stationary; thus with the increase in the percentage of correct responses, the percentage of errors also increased. Though the percentages for errors in the present study were invariably higher than those in Gesell's study, they still show an inverse relation with age and correct responses. Similar is the case with the 'no-responses' category.

B. COMPREHENSION TEST

The Comprehension Test is a little difficult and is altogether different from the action-agent test. This test calls for maturity on the part of the child regarding how far he understands his day-to-day needs and in what way he meets those needs. In other words, the child is expected to enlist steps he takes to fulfil his needs.

The test elicits responses based on an understanding of the concepts of 'hunger', 'sleep', 'loss', 'hurt', 'hot' and 'cold'. The following questions are posed to children:

1. What must you do when you are hungry?
2. What must you do when you are sleepy?
3. What must you do when you have lost something?
4. What must you do when you are hurt?
5. What must you do when you feel hot?
6. What must you do when you feel cold?

Gesell included (1), (2) and (3) for the age-group 3–4 years and (5) for the age-group 4–5 years. He also included the item, "What must you do when you cross the street?" This item is not found suitable for the Indian environment and was therefore replaced by (4) and (6). The test was given to all the children in the age-group 2½ years to 5+years.

Procedure

Wherever the concept was clear, a unit score was given. But since the test is quality-biased, a *verbatim* recording was also done.

TABLE 7

Percentage of children giving correct, incorrect and no responses at different age-levels on the Comprehension Test

Concept	CORRECT RESPONSES *Age in years*				INCORRECT RESPONSES *Age in years*				NO RESPONSES *Age in years*			
	2½+	3+	4+	5+	2½+	3+	4+	5+	2½+	3+	4+	5+
Hungry (1)	55·5	100	100	100	11·1	..	..	.	33·3	..	..	..
Sleepy (2)	55·5	100	100	100	11·1	..	..	..	33·3	..	..	..
Cold (3)	44·4	55·5	70	80	..	11·1	..	..	55·5	33·3	30	20
60 Hot (4)	33·3	55·5	40	60	..	11·1	10	..	66·6	33·3	50	40
Lost (5)	55·5	66·6	90	90	22·2	22·2	10	10	22·2	11·1	..	..
Hurt (6)	44·4	55·5	90	100	33·3	33·3	10	..	22·2	11·1	..	..

Genetic sequences

Table 7 shows the following genetic sequences.

Age 2½ years. At this age, the concepts of 'sleep', 'hunger' and 'loss' are clear to 55·5 per cent of the children; others could give no answer or answered incorrectly. What steps are to be taken when it is cold, or hot or when the child is hurt, is not clear to them.

Taking a concept to be clear when it is correctly used by over 50 per cent of the children, the concepts of sleep, hunger and loss are clear to the 2½-year-old at marginal level.

Age 3 years: At the age of three years, the child is growing out of ills uncertainty and is getting more clear about 'hot', 'cold' and 'hurt' as well. The variety in response is greater and the attempt is made to respond to all terms.

Taking over 50 per cent correct responses as the base, the children at 3+years have started understanding all these concepts thought still in a rudimentary way.

Age 4 years: At this age, all the concepts except 'hot' become clear and elicit a variety of responses showing sufficient signs of the effect of education, culture and technology. The children are now much more aware of their surroundings and of social agencies. But it is strange to note that the concept of 'hot' was correctly understood only by 40 per cent of children; the other 60 per cent did not respond.

Age 5 years: At this age, all the six concepts are clear to the child. Yet, perhaps, 'hot' is the most difficult for them too as only 60 per cent are able to give correct responses.

C. THE CONCEPTS OF NAME, AGE ADDRESS AND TIME

Another test related to comprehension was to know how far children understand the concept of self-name, father's name, age, sex and address. All the children were asked the following questions:

1. What is your name?
2. What is your father's name?
3. Where do you live?
4. Are you a boy or a girl?
5. How old are you?

All these questions were included by Gesell in his language tests.

Mode of scoring: The following mode of scoring was adopted for the different concepts:

1. *Self-name, and* (2) *father's name*: Responses giving surname or first name were taken to be correct.

3. *Age*: Responses giving age correctly up to whole number in years were taken as correct.

4. Residence responses giving full-address such as locality or street or house number were taken as correct.

Concept of time. In order to know the child's concept of time, the questions were framed in such a way that he could give some idea of morning, noon and evening. The questions asked were as follows:

1. When do you go to school?
2. When do you come back from school?
3. When does your daddy come back from office?

It was found that though these items are sufficiently discriminating, the response pattern does not give a clear picture of the child's thoughts. In order to know the child's concept of time better, it was decided the questions should be modified for future work in the following form ·

1. What do you do in the morning?
2. What do you do in the afternoon?
3. What do you do in the evening?
4. What do you do at night?

These questions are activity-centred and equally well-suited for response-flexibility so that the child can narrate events at ease.

Table 8 shows the following genetic sequences:

TABLE 8

Percentage of children at the different age-levels giving the different responses on the Test of Concepts

	CORRECT RESPONSES				INCORRECT RESPONSES				NO RESPONSES			
Concepts	*Age in years*				*Age in years*				*Age in years*			
	2½+	3+	4+	5+	2½+	3+	4+	5+	2½+	3+	4+	5+
Self-name	..	55·5	30	60	44·4	33·3	40	30	55·5	11·1	30	10
Father's name	11·1	11·1	20	20	44·4	55·5	80	40	44·4	33·3	..	40
Age	22·2	11·1	20	40	33·3	66 6	50	30	44·4	22·2	30	30
Address	22·2	55·5	50	50	44·4	40·4	40	30	33·3	..	10	20
Concept of Time												
Morning	11·1	66·6	70	80	55·5	11·1	20	10	33·3	22·2	10	10
Noon	11·1	44·4	70	80	55·5	33·3	30	10	33·3	22·2	.	10
Evening	11·1	55·5	80	90	44·4	22·2	20	10	44·4	22·2	..	..

Age 2½ years. If 50 per cent is taken as the cut-off point, a 2½-year-ol child is unable to give his full name, his father's name, his age, or his plac of residence No idea of time has yet developed in him.

Age 3 years. Self-name is becoming more clear at this age and the 3-year old child takes pride in giving his full name. He is able to tell his house number and the locality where it is situated. His father's name and his own age are still not clear to him. The 3-year-old understands morning and evening but not noon.

Age 4 years. At this age, the first name is preferred as against the full name. The father's name and the child's age are still given incorrectly, and residence is identified predominantly by locality. The 4-year-old has developed a fairly good understanding of morning, noon and evening.

Age 5 years. The child at five can give his full name, but is not yet clear about his father's name. The child is just learning to tell his correct age. He identifies residence predominantly by locality, house number and street. The concepts of morning, noon and evening are clear to him.

Thus it appears that even at the 5-year-level, concepts of father's name and age are not yet clear to the children Even with regard to self-name and residence, only 60 per cent and 50 per cent respectively could give correct responses; this shows that these are clear to them only at the marginal level.

However, as regards the concept of time, the concepts of morning, noon and evening are fairly clear to the child, at age 5 years.

C. MOTOR DEVELOPMENT

Objectives

The main objectives of testing the motor development of children during the pilot study were to develop and standardize: (*a*) testing equipment, and (*b*) observational schedules. The Gesell's Schedules available in India included only the adaptive tests but not the equipment for testing motor development. All this equipment had to be devised and tested before starting the final testing programme.

Description of test items

The following items to test motor development were included in the present study:

a. Throwing a ball,
b. Kicking a ball,
c. Catching a ball,
d. Standing on one foot,

e. Walking on walking boards and other types of walking,
f. Running,
g. Ascending and descending,
h. Sikpping,
i. Jumping,
j. Threading beads,
k. Cutting with a pair of scissors.

All items excepting items (*j*) and (*k*) were included in the Gesell's scale also.

Equipment devised in the study

The following equipment was devised in the present study:

a. High Jump Stand,
b. Jumping Table,
c. Walking Board,
d. Steps.

a. High Jump Stand. This consisted of the normal high jump stand but instead of the usual holes, it had nails fixed at a distance of every two centimetres. A bamboo stic, about 4 metres in length, was placed on the nails at required heights. The stick ensures more safety because in case the child is unable to clear the heights, the stick falls off and the child escapes being tripped. (In the ordinary form of the stand there is a string which is liable to get caught in the child's foot.)

b. Jumping Table. This consisted of a table, 40 centimetres in height, the legs of which could be adjusted to four times more different heights: 55 cm, 70 cm, 80 cm and 90 cm.

It required considerable amount of experimentation to arrive at the proper design for this table. It was necessary to avoid two things: (i) any shaking as it made the children anxious; (ii) any support to the child to hold on to while jumping as it altered the child's posture. The design finally arrived at eliminated both these difficulties.

c. Walking Board: This consists of four planks of width 8 cm, 6 cm, 4 cm and 2 cm. Each plank has the same length of 2·5 metres. They are fitted at about a height of 10 cm from the floor level by means of square platforms at each end of the board; this makes it possible for the child to start flush with the walking surface of the board and to finish with both feet at this level. The following had to be kept in view while preparing the boards:

(i) The board should be heavy so that there is no shaking but it should at the same time facilitate easy manipulation,

(ii) The board should be tightly fitted to the platform but at the same time it should be possible to dismantle it easily so that the other boards could be fitted in.

d. Steps: A portable staircase consisting of five steps and a railing was designed. The problems to be faced were more or less similar as in the case of the walking board. For portability, the staircase had to be light; at the same time it was necessary that it should be stable. It should also be tightly fitted but at the same time it should facilitate easy dismantling. A model was finally devised after considerable experimentation.

Preparation of observation schedules

The other objective of the present study was to prepare uniform observation schedules for all the motor items. An attempt was made to make the schedules as objective as possible, first by analysing each behaviour into meaningful elements and then by illustrating it to facilitate the understanding of the terms under reference.

I. For instance, the test item on "Throwing a Ball" was broken into six elements: (1) Standing or running with the ball before the throw; (2) Feet position; (3) Position of the body; (4) Position of the arm; (5) Release of the ball; (6) Distance of the throw. These six elements were further divided into sub-items and were accompanied by illustrations. For example, the 'position of arm' included six elements such as: (1) upper arm at shoulder level; (2) arm above the head; (3) arm in triangular position below shoulder level; (4) cyclic action; (5) arm down in front of the body; (6) arm near the chest.

Each of the motor tests were dealt with in a similar fashion. It was necessary to itemize them in such a way because a large number of workers had to be involved in the forthcoming major study and there was the likelihood of an element of subjectivity creeping in if the tests were left global.

D. PERSONAL-SOCIAL DEVELOPMENT

The objective here was to develop an interview schedule working round the items of behaviour on which Gesell's results are available. Gesell did not report having used a schedule for this purpose. But in the present study it was necessary to have the interview in a more structured way in order to ensure uniformity and completeness of the information collected.

The schedule did not involve any testing as such but observations were to be obtained, wherever possible, from three sources: mother, teacher and examiner. It included the following types of personal social behaviour: (i) eating; (ii) sleeping; (iii) elimination; (iv) dressing; (v) personal hygiene; (vi) communication; (vii) play activities; (viii) developmental detachment.

After considerable observation and discussion, a schedule that was objective and comprehensive was developed.

One of the units is described in order to give an idea as to what the schedule is like. For instance, take the first unit on Eating. The unit on Eating has two major categories: (A) Self-feeding; (B) General Response to Meals. Self-Feeding includes: (1) Hold of the cup and the glass; (2) Use of the spoon; (3) Spilling while eating. General Response to Meals includes information on: (i) bottle-feeding; (ii) assistance required in feeding; (iii) eating difficulties, such as food fussiness, dawdling and food refusal; (iv) willingness to serve self and others. The sub-items are further categorized. For instance, the item on 'Hold of the Cup' is divided into: (i) holds cup with both hands while lifting the cup, while drinking and while replacing the cup; (ii) holds cup with palm while lifting, drinking and replacing; (iii) holds cup with digital grasp while lifting, drinking and replacing. Along with these descriptions, illustrations are also given so that the items are clear to the field workers. All the units in the schedule are dealt with in such detail so that the observers face the minimum difficulty in entering the required information.

CONCLUSION

The pilot study thus achieved the following.

a. It led to the development and adaptation of the testing equipment and test items used in Gesell's Development Schedules, for use with children in India.

b. It led to the development of meaningful record forms for all the tests included in the study in order to ensure objectivity in observation.

c. It also led to the development of procedure booklets for administering different tests so as to maintain uniformity in the testing work by different field workers.

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State-wise Disparities in Sectoral Allocations in Indian Education[1]

S. N. Pandit

The investment on education in India varies from State to State, and the variations between the allocations for the various stages of education within a State are even sharper. In this paper the author makes a cross-sectional analysis of the disparities in sectoral allocations in Indian education, State-wise, with special reference to school education.

The availability of physical capital, raw materials, market, entrepreneurial ability and technical and skilled manpower are some of the crucial factors which determine the capacity of an economy for its development. These factors can be grouped under two headings: human capital and physical capital. The nature and size of human capital in the final analysis of growth economies appears to be the most strategic and critical determinant of over-all development. Despite the crucial role of human capital, the emphasis on the investment in education has not been uniform in economic literature It is only recently that trained manpower has been accepted as a produced means of production. Many empirical studies in the U.S.A., U.S.S.R., U.K., Venezuela, India and other countries have revealed that investment in education is as profitable (even more in some cases) as investment in physical capital.[2] Therefore, it has been accepted that in all developing countries the human capital formation is as necessary a condition for economic growth as is the physical capital formation. In India, the expansion after 1947 in both modern and traditional sectors of the education industry has been impressive. Due recognition seems to have been given to the investment in education all along in the Five-Year Plans of the country. But a closer examination of the whole system of education reveals that there are wide variations in the sectoral allocations in education. These variations are investigated here with the help of cross-section data pertaining to Indian States, for 1960–61.

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[1] The present study is based on the author's investigation as a research fellow at the Institute of Economic Growth, University of Delhi, during 1967. The views expressed in this paper are those of the author and not of the organization where he is presently working.

[2] See :

1. C. A. Anderson and M. J. Bowman (Ed.). *Education and Economic Development*, UNESCO, 1964.
2. Baljit Singh (Ed.). *Education as Investment*. Meenakshi Prakashan, Delhi, 1967.
3. King Hall *et al.* (Ed.). *Year Book of Education : Educational Planning*, 1967. Evan's Brothers, London, 1967.
4. H. N. Pandit (Ed.). (i) *Measurement of Cost Productivity and Efficiency of Education* (forthcoming). National Council of Educational Research and Training, 1969; (ii) *Monograph on Plan of Studies in Economics of Education*, New Delhi, NCERT, 1966.

Investment in the Indian education industry: A historical perspective

As early as 1944, the Sargent Committee on the Post-War Development of Education projected the financial effort to be made by the country on a long-term basis. The whole effort was re-examined by the Kher Committee in 1951; it suggested that the Central Government should spend ten per cent of its budget on the development of education and that every Indian State should spend at least twenty per cent of its budget on the development of education. However, it was only in 1964–66 that the Education Commission in its report, *Education and National Development,* projected the size and structure of the national financial effort required during the next twenty years on a more scientific basis.[1]

Since 1950–51, educational expenditure has been rising. It has risen from Rs. 144 crores in the beginning of the First Five-Year Plan to Rs. 600 crores at the end of the Third Five-Year Plan. In terms of the National Income, it has risen from 1·2 per cent to 2·9 per cent during the same period. Now, the Central Government is spending three to four per cent of its budget on education, and most of the States are spending over one-fourth of their budget. It is with this background in view that the State-wise variations in expenditure allocations among different sectors in school education and in over-all education are examined here.

Approach

The financial effort made for education varies from State to State and variations between the various stages of education within a State are even sharper. The two forces responsible for these variations in the supply of resources for education are: (*a*) the capacity of the State to support education, and

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[1] Ministry of Education, Government of India. *Education and National Development,* 1966.

(*b*) its willingness to support education. On the demand side, the social deman load for education is examined here. The over-all relationships are examine with the help of the mathematical model given below:

$$E_i = A_i X_1^{a_i} X_{2i}^{b_{i2}} X_{3i}^{c_{i3}} \quad \dots\dots \quad (1)$$

where E_i = educational expenditure per pupil in the *i*th level of education,

X_1 = *per capita* State income (power to support education),

X_2 = percentage of State income spent on education (willingness to spend on education in the *i*th level of education),

X_3 = number of school-going children per thousand of population in the *i*th level of education.

i = primary, middle, higher secondary and entire education.

A_i = constant, for *i*th level of education.

a, *b* and *c* are elasticity coefficients.

Limitations and sources of data

The per pupil expenditure, number of school-going children per thousand of population and percentage of State income spent on education have been computed from the data available in *Education in the States 1960–1961: A Statistical Survey* (Ministry of Education, Government of India, New Delhi). The data relates to the year 1960–61, and for the sake of uniformity, the academic year has been taken to coincide with the financial year, *i.e.*, to extend from 1 April 1960 to 31 March 1961. The statistics relate only to registered institutions, *i.e.*, those in which the course of study followed is either prescribed or recognized by the Government or by a University or a Board of Secondary and Intermediarte Education constituted by law, and which satisfy one or more of these authorities as the case may be, and attain a reasonable standard of efficiency. They are open to inspection and their pupils are ordinarily eligible for admission to public examinations and tests held by the Government or the University or Board. Only those research institutions have been taken into account which provide facilities for teaching. For definiteness, the enrolment in the institutions on 31 March 1961 has been taken. The total expenditure could not be obtained for each level of education separately and therefore only *direct* expenditure has been analysed for the first three levels of school education. For assessing the over-all position, total expenditure, including *direct* as well as *indirect* expenditure in relation to total number of students, has been analysed.

'Direct expenditure' includes money paid to teachers in the form of salaries and other forms of expenditure not included in indirect expenditure. 'Indirect expenditure' represents the amount incurred on direction, inspection, buildings, furniture, scholarships, hostel charges and other miscellaneous items.

The *per capita* State income figures for the year 1960–61 have been taken from *Distribution of National Income by States* (National Council of Applied Economic Research, New Delhi).

Disparities in educational development deepened

Article 45 of the Indian Constitution reads, "The State shall endeavour to provide within a period of ten years from the commencement of the Constitution, free and compulsory education for all children until they complete the age of 14 years." Even after the completion of 20 years of planning, we have not been able to achieve the target enshrined in the Constitution. In the Third Plan emphasis was again laid on the implementation of the above directive. In view of the magnitude of the task, however, it was agreed that as a first step facilities should be created for education for all children in the age-group 6–11 years in the Third Plan to be followed by expansion of education of the age-group 11–14 years during the Fourth and Fifth Plans[1] Even after these vigorous efforts, targets have been achieved in terms of enrolment of boys only; we are still lagging far behind in girls' enrolment.[2] In higher education, large imbalances between sectors and regions have deepened during the last three Plans. There is today the paradoxical situation of both surpluses and shortages of educated manpower.[3] In this paper are presented only State-wise variations in the 'effort' made to meet the 'need' for facilities during 1960–61.

Capacity and willingness to support educational expansion

At the outset, let it be mentioned that there are conceptual and statistical difficulties in comparing State income estimates, and comparisons without adjustments in the estimated income figures give misleading conclusions. Keeping in view the limitations of income data and those in the operating expenditure for education mentioned earlier, the analysis made here has to be used cautiously for policy purposes. In Table 1 we present a summary of the State-wise variations in the capacity to support educational expansion and the States' willingness to undertake the same.

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[1] See *Third Five-Year Plan,* Government of India, Planning Commission, p. 578, and J. P. Naik *Constitutional Directive on Free and Compulsory Education.* Education Commission, New Delhi, 1965.

[2] Please see the State-wise variations in the enrolment rates as revealed by the NCERT's nation-wide survey, (*Second All-India Educational Survey*), 1966.

[3] See: London School of Economics/Indian Statistical Institute Document entitled, *Manpower and Educational Development in India* (1961–86), and H. N. Pandit, Nature and dimensions of unemployment among educated persons in India, *Manpower Journal*, Vols. 3 and 4, 1966. (New Delhi: Institute of Applied Manpower Research) gives general manpower situation in India.

TABLE 1

*State-wise variations in capacity and willingness to support educational expansion, 1960–61**

S. No.	Item	Average for All States	Coefficient of Variation	Range
1.	Capacity to support education (Income *per capita*)	334·54	97·40	468·54—220·69
2.	Willingness to support educational effort (Educational expenditure as percentage of national income)	2·35	81·98	3·64— 1·53

* Source : Appendix Tables 1 and 2.

It is seen from Table 1 above that the States are more homogeneous in respect of willingness to support education than in terms of capacity to support educational expansion. In Table 2 below, States have been allocated in a bivariate table according to the capacity and effort to support educational expansion.

TABLE 2

Allocation of States according to income per capita *and Effort to support Education, 1960–61***

Effort to Support Education Income *per capita*	I Category (3·64–2·46)	II Category (2·35–2·19)	III Category (2·10—1·53)
I Category (468·54–334·09)	Madras Maharashtra	Gujarat	West Bengal Punjab
II Category (333·34–297·35)	Kerala Mysore	Assam	Uttar Pradesh
III Category (287·01–220·67)	Andhra Pradesh	Bihar, Madhya Pradesh Rajasthan	Jammu and Kashmir Orissa

** Source : Appendix Tables 1 and 2.

From Table 2 we observe that the correlation between the capacity and the effort to support educational expansion is not very strong. The average all-India *per capita* income is Rs. 334·54. Four States—Maharashtra (Rs. 468·54), West Bengal (Rs. 464·62), Punjab (Rs. 451·31), and Gujarat (Rs. 393·39)—have *per capita* income above the national average. The remaining eleven States—Madras (Rs. 334·09), Assam (Rs. 333·34), Kerala

(Rs. 314·86), Mysore (Rs 304·71), Uttar Pradesh (Rs 297·35), Andhra Pradesh (Rs. 287·01), Madhya Pradesh (Rs 285·35), Orissa (Rs. 276·22), Rajasthan (Rs. 267·43), and Bihar (Rs 220·69)—have *per capita* incomes below the national average The *per capita* income used here to measure the capacity to support education shows that a great diversity obtains among Indian States Coming to the effort made by the States, we see that in the country as a whole, about 2·35 per cent of the national income is spent on education. Kerala ranks seventh in *per capita* income, but in its effort to invest in education it is leading all the States in the country.

The States are investing between 1·5 per cent and 3·6 per cent of their incomes on education.

Table 3 below shows the extent of State-wise variation in the operating cost per pupil according to the level of education. It is seen from the table that the cost per pupil varies considerably as we move from the primary to the middle and from the middle to the higher secondary levels.

TABLE 3

Average Operating Cost Per Pupil and Coefficient of Variation according to Level of Education, 1960–61*

S. No.	Level	Average Operating Cost per Pupil	Coefficient of Variation	Range
1.	Primary	21·50	91·80	30·90–13·94
2.	Middle	59·08	177·78	125·29–19·72
3.	Higher Secondary	219·15	101·38	347·08-96·65
4.	All levels of education, including higher education	71·80	71·63	87 36–44·47

* Source Appendix Table 1.

The highest operating cost (Rs. 31) per pupil in primary education is in Madhya Pradesh, and the lowest (Rs. 14) is in Bihar. In Orissa, Gujarat, Maharashtra, Mysore and Jammu & Kashmir, the operating cost per pupil ranges from thirteen to nineteen rupees. In Uttar Pradesh, Assam, Madras and Punjab, the expenditure per pupil ranges from nineteen to twenty-five rupees In Andhra Pradesh, Rajasthan, West Bengal, Kerala and Madhya Pradesh, the operating cost per pupil ranges from twenty-six to thirty-one rupees.

In middle school education the average operating cost ranges from twenty rupees to one hundred and twenty-five rupees. Such a high degree of variability in operating cost is not present in primary school education The highest average per pupil operating cost is in Maharashtra and the lowest is in West Bengal.

In higher secondary education there is a lesser degree of variability in average operating cost, compared to middle school education. The high
pupil operating cost (Rs 347) is in West Bengal and the lowest per
operating cost (Rs. 97) is in Bihar.

At all levels of education, there is a lesser degree of comparability in average per pupil operating cost compared to the above-mentioned three levels of education. It varies from Rs. 44 in Orissa to Rs. 87 in Punjab.

Social demand load

The educational load varies from State to State and from level to level. Table 4 below shows the variation in educational load from State to State and from level to level.

TABLE 4

*Sectoral Social Demand Load for Indian States, 1960–61**

S. No.	Level of Education	All India Average	Coefficient of Variation	Range
1.	Primary	78	85·93	126–55
2.	Middle	17	234 44	53– 5
3.	Higher Secondary	7	185 00	20– 3
4.	All levels including higher education	109	100 35	197–76

* Source : Appendix Table 2.

The highest educational load is in Kerala where 197 students per 1,000 of population are studying in various levels of education. The lowest educational load is in Rajasthan where 76 students per 1,000 of population are in educational institutions On the national level, there are 109 students per 1,000 of population studying in educational institutions. Maharashtra (143), Gujarat (139), Madras (132), Assam (130), Mysore (122) and West Bengal (117) have an educational load above the national average Punjab (106), Andhra Pradesh (104), Bihar (97), Orissa (96), Jammu & Kashmir (89), Madhya Pradesh (79), Uttar Pradesh (77) and Rajasthan (76) have an educational load below than the national average. The variation in educational load from one level to another, from one State to another State, is not marked.

Sensitivity Coefficients of determinants of Operating Cost Per Pupil

The elasticity coefficients of determinants of operating cost per pupil are given in Table 5 on page 99. From this table the following inferences can be made :

1. The over-all cost per pupil is more sensitive to the capacity of the States to support education than the power to support educational expansion.

2. Variations in primary school educational expenditure are more accounted for by the variation in the will to support education than the power to support education. The elasticity of the will to support education is 102 per cent as shown by the model against 90 per cent in the case of power to support education.

TABLE 5

Elasticity Coefficients of the Operating Cost Per Pupil for the different levels of education, 1960–61

S. No.	LEVEL OF EDUCATION	CONSTANT	PER CAPITA INCOME	% OF STATE INCOME DEVOTED TO EDUCATION (*Willingness to support Education*)	NO. OF CHILDREN PER THOUSAND OF POPULATION (*Social Demand Load*)	R'
1.	Primary	1·1966	0·9083	1·0157	−0·9833	0·9061
2.	Middle	1·0902	0·9771	0·9550	−1·0511	0·9366
3.	Higher Secondary	0·9385	0·9838	0·9903	−0·8843	0·9183
4.	All levels, including higher education	0·9653	0·9806	0·9428	−0·9490	0·9961

3. So far as middle and higher secondary education is concerned, the *per capita* income is more powerful in influencing the expenditure at these two levels than the will to support education.

4. The Social Demand Load has a decisive effect in increasing the pressure for expenditure on education, and its pressure varies from level to level as given in the table.

APPENDIX TABLES

TABLE 1

Average operating cost per pupil in various levels of education and capacity to support educational expenditure in Indian States, 1960–61

S No.	STATE	AVERAGE OPERATING COST				
		Primary	*Middle*	*Higher Secondary*	*All levels of educationg including higher education*	*(Amount in rupees) Per capita State Income*
1.	Andhra Pradesh	25·56	40·76	273·80	68·91	287·01
2.	Assam	19·79	45·21	150·81	58·14	333·34
3.	Bihar	13·94	49·31	96·65	50·14	220·69
4	Gujarat	15·76	90·94	132·42	66·07	393·39
5.	Jammu and Kashmir	18·11	53·07	283·05	64·73	289·02
6.	Kerala	27·19	37·78	129·78	58·21	314·86
7.	Madhya Pradesh	30·90	81·02	246·25	78·55	285·35
8.	Madras	21·84	60·38	231·72	71·35	334·09
9.	Maharashtra	17·55	125·29	284·41	86·45	468·54
10.	Mysore	18·10	104·08	140·89	61·06	304·71
11.	Orissa	14·61	74·51	129·43	44·47	276·22
12.	Punjab	24·85	39·04	265·35	87·36	451·31
13.	Rajasthan	26·20	85·96	321·12	83·12	267·43
14.	Uttar Pradesh	19·18	33·16	265·16	70·34	297·35
15.	West Bengal	26·72	19·72	247·08	83·55	464·62
All India		21·50	69·08	219·15	71·80	334·54

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TABLE 2

Effort and Social Demand Load in Indian States in 1960–61

S. No.	State	Percentage of State Income Spent				Number of Children per 1000 Population			
		Primary	*Middle*	*Higher Secondary*	*All levels including higher education*	*Primary*	*Middle*	*Higher Secondary*	*All levels including higher education*
1.	Andhra Pradesh	0·74	0·16	0·52	2·49	83	11	5	104
2.	Assam	0·56	0·25	0·48	2·27	95	19	11	130
3.	Bihar	0·43	0·26	0·31	2·20	69	12	7	97
4.	Gujarat	0·35	0·56	0·44	2·33	88	24	13	139
5.	Jammu and Kashmir	0.37	0·31	0·62	1·99	59	17	6	89
6.	Kerala	1·04	0·64	0·81	3·64	126	53	20	197
7.	Madhya Pradesh	0·67	0·28	0·33	2·19	62	10	4	79
8.	Madras	0·65	0·37	0·55	2·82	99	21	8	132
9.	Maharashtra	0·37	0·51	0·52	2·64	100	19	10	143
10.	Mysore	0·55	0·53	0·33	2·46	92	15	7	122
11.	Orissa	0·43	0·13	0·18	1·53	80	5	3	96
12.	Punjab	0·39	0·19	0·49	2·05	71	22	8	106
13.	Rajasthan	0·54	0·33	0·46	2·35	55	10	4	76
14.	Uttar Pradesh	0·36	0·12	0·43	1·81	56	11	5	77
15.	West Bengal	0·44	0·09	0·47	2·10	76	22	6	117
All India		0·50	0·29	0·47	2·35	78	17	7	109

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Educational Provisions for the Gifted: A Review

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The authors review significant studies in the area from 1928 to 1967 and discuss in detail the findings regarding the different types of programmes—the special class, acceleration and enrichment—that have so far been tried out for the gifted.

The present paper deals with the educational provisions for only a segment of today's children, namely, the gifted or the talented, "who must be the leaders and guides of the next generation in every field of activity." (Joshi, 1967.) Any special treatment for those few fortunate to be more intellectually equipped than the rest may seem like a deviation from the democratic principles of India, but as has been proved in other democratic and advanced countries, "paradoxical as it may seem, equality requires special treatment of such talent". (Datta, 1967.)

At the eve of an educational renovation, India is faced with the responsibility of perceiving the need of and empirically evaluating the efficacy of educational systems and provisions best suited for a growing nation. The need for special provisions for the gifted, starting at an early level, has been recognized by the Education Commission (1964-66) and by several educators in India (Kumar, 1967). Joshi (1967) suggested:

> It is necessary that students belonging to these categories (gifted, talented, etc.) should be located at an early age, offered a challenging curriculum best suited to their talents, and educated through less traditional and more dynamic methods of teaching so that their creativity is not blunted by the tyranny of formal teaching methodology, which is aimed at teaching the average—itself a statistical abstraction—and which often proves a retarding factor in the education and learning of the intellectually endowed. (Joshi, 1967.)

Once the need for special provisions for the gifted is established or accepted, educators and administrators face the question as to whether there is one or a combination of several special provisions best suited for this purpose. Research can suggest some possible guidelines to the answer, and the need of research for educational planning has also been recognized recently by the Education Commission (1964–66) (Leonard, 1967). In spite of the fact that any educational provision in India would have to be moulded according to the country's environmental requirements, the research findings, opinions, and thoughts of the educators of other countries could also be helpful contributions towards the enrichment of ideas for educational planning in India. This paper is an attempt to present only a brief segment of the vast wealth of materials in the field of educational provisions for the gifted in the United States over the past four decades. The United States has been going through the same experimental fervour that is so imminent in India today and it is hoped that a selected review would be of some interest to the educators of India today.

Since the 1860's, the nature of the proper teaching procedure for gifted children has been a matter of concern and controversy in the United States (Goddard, 1928). This is even stronger in the present decade. As Odell (1951) has pointed out, "there is general agreement that schools are failing adequately to educate the superior child But there is no agreement on the 'best' provision for the solution of thi sproblem." The Sub-Committee on Needed Research on Gifted Children of the APA Division of School Psychologists suggested that more research is needed to find out the relative merits (emotional, social and intellectual) of various administrative plans for the gifted (O'shea, 1960). Since a coverage of the vast literature in this area seems to be almost an impossibility, only a few selected sources will be discussed, primarily at the school level. Because of the controversy regarding the definitions of 'gifted', 'talented', 'superior' and such other terms, and because of their interchangeable use throughout the literature, these terms will be used as somewhat synonymously through the succeeding discussion, and no particular definition of 'gifted' will be set for this paper.

The scope of this review would be confined within some of the major provisions in the teaching of the gifted, namely, acceleration, enrichment and special classes (including the homogeneous and heterogeneous groupings) In spite of the fact that the discussion of these provisions in the literature, mostly overlap or depend upon each other an effort would be made here to treat each of them separately as far as possible.

Acceleration

As Goddard (1928) has pointed out, acceleration was one of the first methods used in recognition of the needs of the gifted pupils. Several types of acceleration have since been adopted and practised in the schools of the

United States, grade-skipping, advanced placement, telescoping and early admission are but a few of them. There are arguments both for and against each of these methods, but writers seem to be more or less unanimous about the undesirability of grade-skipping, Martense (1933) has termed it a "dangerous practice", and Barbe (1963) thought of it as the "least desirable method of acceleration." The most common argument against this and most other methods lies on the probability that the child may not be socially and physically mature enough to adjust with the chronologically older children, and social and emotional maladjustment might be the consequence. Though Odell (1951) has mentioned some advantages of grade-skipping as a challenge to the more able student, as an opportunity to avoid frustration and bad word habits, as the easiest administrative procedure to utilize and as a time and money saver, he himself and some others have pointed out that the socio-emotional growth rate of the child should be carefully considered before any grade-skipping is administered (Odell, 1951; Barbe, 1963; Baker, 1959; Kirk, 1962; Wilkins, 1936). (It seems that this caution holds true in the case of any other accelerating procedure such as early admission, advance placement, and so on.) The possibility that the skipping of some grades may be of disadvantage in mastering later learning materials has been another factor of concern in this matter, and to place a child in double grade (where he can do the work of two grades) is sometimes thought of as a probable solution to this problem (Martense, 1933; Barbe, 1963) The results of some of the studies on these different types of acceleration may be of some interest in this context

Unzicker (1932) reported a study "to determine the achievement in the ninth grade of pupils of superior ability (no information about the IQ), who had been permitted to do the work of the seventh and eighth grades . . in one year in comparison with the achievement of a group of equal ability who had taken two years in which to finish the first grades." The results failed, "in aggrefate, to show a significant difference for either group" Another finding of this study seems to be of enough interest to be mentioned. Unzicker found out that after a period of two years (with the experimental groups) and three years (with the control groups), the top ten per cent of both groups spread over to the sixty per cent, as a result of which he raised a reasonable question: "What evidence is there that the bright child who has ranked high in Grade VII B and who ranks below the median of the class in Grade IX A is benefited by having been accelerated?" He consequently stated that "one hesitates to conclude that mass acceleration is the best solution to the problem."

Wilkins (1936), however, came to a somewhat different conclusion after a study of a group of 282 pupils chosen by the single criterion of graduation at least one month before the age of seventeen. Though he could not get any data on the control pupils, a limitation which he himself recognized, he came to the conclusion that "pupils who are accelerated in the elementary school, achieve more than satisfactorily in the secondary school". (The information on what particular method of acceleration was employed in this case, does not seem to be very clear.)

Two studies on the socio-intellectual adjustment and progress of children, as a result of early admission to the primary grades, have been reported by Hobson (1947) and Birch (1954). On the basis of the individual records over a ten-year period of a group of children who had been admitted to the kindergarten and first grades and were as much as nine months or more below the regular chronological age but were admitted on the basis of their mental age, Hobson stated that these children were superior to their fellows academically and showed no personal or social maladjustment. Birch's (1954) report was based on the study of "43 mentally advanced children, who were accelerated one full year in school age-grade placement by early admission to first grade," and he concluded that "early admission to first grade seems to combine most of the favourable features associated with acceleration and to minimize the unfavourable features." It is noticeable in their studies that both of them stressed the unfavourable consequences of later acceleration, implying thereby that they did not support grade-skipping.

Flesher and Pressey (1955) did a follow-up study of 145 young women (who during the war years, completed a four-year undergraduate programme in three years or less) and compared them with their matched control groups, after ten years of their graduation from college. The authors mention that "a previous study had shown the accelerates doing slightly better academic work than their controls and participating about as much in campus activities." The purpose of the follow-up was to investigate about their careers and opinions about the college programme. They found out that "very few accelerates thought their acceleration programmes unfortunately affected health, school work or social life. A majority felt acceleration a desirable challenge and saving of time. The non-accelerants were throughout more critical and dubious about acceleration." (Flesher and Pressey, 1955.)

Klausmeier and Ripple (1962) and Klausmeier (1963) reported the results of two consecutive studies of a group of bright pupils, who were accelerated from second to fourth grade after a five-week summer session in which they were taught the third-grade materials. The authors came to the conclusion that acceleration had no undesirable effect either intellectually, socially or emotionally upon the pupils and suggested that the benefit of this early acceleration would manifest itself in early graduation of these students.

Apart from early admission, grade-skipping, double grading and so on, advanced placement is being considered as another important and controversial method of acceleration (which 'offers the students the opportunity to complete some of their college work while still in high school' and get credit for it). As a matter of fact, Tliegler and Bish (1959) have described it as "the most important recent method of acceleration," and suggested that it "undoubtedly can improve high school curriculums and articulation between high school and college." Jones and Ortner (1954) described a system at the University of Buffalo to give college credits to superior entering students on the basis of an examination for achievement beyond that required for high school graduation They reported a study of 188 of these students and their matched control group, where it was found that there were few significant differences between the two groups, but the college grade averages were "slightly in favour of the group who took the examination." The drop-out rate was lower in this group, and though they were younger than the other group in graduation, they were as active in extra-curricular activities as others. In a follow-up study after several years, they found that there was a somewhat greater chance for the "examination group" to take post-graduate work or professional studies. Gerritz (1965) supports advanced placement on the grounds that · (i) it provides for individual differences; (ii) it provides strong incentive and confidence; (iii) it saves some college cost and time; (iv) it provides good transition from high school work to higher education; and (v) it prepares students better for college work and tends to encourage graduate work Haywood (1965), however, in spite of admitting that the basic objectives of the advanced placement are highly desirable, maintains that:

> It has four rather disturbing tendencies: (*a*) to sacrifice a sound curriculum in order to bask in the prestige of offering courses for the elite, (*b*) to foist specialization on the student at too early an age ("in a day when a learned botanist can communicate with a learned sociologist only about the battering average of Mickey Mantle, the further narrowing of interest is a danger of no little magnitude", p. 24); (*c*) to divert the better, more imaginative and superior teacher into areas not essentially a part of the high school's responsibility; and (*d*) to sacrifice academic enrichment for the sake of acceleration. (Haywood, 1965.)

It is evident that arguments both for and against advanced placement (as with the case of most other procedures), seem to be equally strong and valid, but since this is a relatively young method, it can be hoped that time would prove its worth.

Before proceeding to the literature on special class and enrichment, one point may be touched upon parenthetically. Throughout the literature on acceleration, it has been noted that time-saving has been considered as a major benefit of administrative acceleration. It is thought that acceleration would permit the "gifted individual to enter his life's work early and thus to fill a desperate need for high ability in our national and industrial life." (Freehill, 1961.) There may be some truth and foundation in this expectation, but the comment of Goddard (1928) seems to be worth mentioning in this context. He maintains that:

> The rapid promotion and early graduation is a will-o'-the-wisp which is not worth chasing. The period of childhood and youth up to manhood and womanhood seems to be required to prepare the individual for the more serious duties of adult life, and it does not seem very reasonable to expect that, with the increasing complications of civilization, the preparation for adult life can be shortened. Rather, it would seem that it ought to be lengthened. (Goddard, 1928.)

The opinions and counter-opinions on this point may be of considerable interest to the future citizens of India.

Special class

The discussion, however, should be brought back to its track and the literature on special classes for the gifted may be briefly explored. "The term 'special class' refers to the organizational scheme which seeks out the gifted children and places them together in a group for instructional purposes." (Sanders, 1961.) There is a strong diversity of opinion regarding the desirability of special class *versus* regular class or homogeneous *versus* heterogeneous grouping, and as has been pointed out by Sanders (1961) there is no firm conclusion on this point. Persons in favour of the special class and/or homogeneous grouping have frequently cited the Major Work Programme and its success in Cleveland, Ohio. They contend that in special classes the teachers can take note of the individual differences, interests and needs of the gifted pupils, which is sometimes impossible in a regular classroom (Barbe, 1963). Besides that, "because of the higher standards required, ability grouping has the advantage of challenging the more able students to a greater degree than does a heterogeneous class" (Odell, 1951; Baker, 1959). Contrary to the general opinion that gifted students in the special class may be conceited and egotistic, the proponents of special classes assert that in a special class among others as bright as he is, the gifted child is less apt to develop these complexes than in a regular class, where he constantly finds himself to be superior to others (Martense, 1933). As Makovic (1953) and Baker (1959) have pointed out, the opponents of special class and/or homogeneous grouping indicate, on the other hand, that the gifted children should be in the regular heterogeneous classroom in order to avail themselves of the association of "other types of minds, interests and abilities, which is an actuality in adult life", and to provide stimulation and competition to the average students. However, Baker (1959) notes that "specific evidence is needed to prove or disprove the merits of these considerations." Johnson (1943) opined that some of the gifted children are likely to have some emotional problems and suggested that "to deal with them,... obviously does not require placement in segregated groups. It requires individual guidance, the modification of viewpoints, the creation of new purposes, the development of new interests. Usually the attainment of these ends is easier in a regular class than it is in a segregated group."

In between these two extremes of regular class—heterogeneous groping and special class—homogeneous grouping, there is a third school of thought which believes in partial segregation. Pregler (1952) is one of them. In partial segregation, the gifted children spend some of their class time in their home rooms with their chronological age-group, and some time in the special classes with their intellectual age-group. Pregler has described the Colfax Plan in Pittsburg, Pennsylvania. In this programme the children spend half of the day in the workshop (to read, discuss, work and plan) and the other half in the home room (for art, music, physical education and other cultural experiences) (Pregler, 1954) Considering all the pros and cons of the two extremes of classroom groupings, the worth of partial segregation seems to be less controversial and more effective.

So far mostly the theoretical viewpoints about special and regular classes have been considered. At this point some of the work that has been done on this aspect may be briefly mentioned. In 1940, a special class was set for a group of sixteen third and fourth grade pupils (IQ 129–159, median 134) of the Brockton Public School System at Massachussetts, and a matched control group was established. These children had their studies with their intellectual equals in the special class, and recreation and social activities with children of their own age (Carlson and Wiles, 1943). The curriculum for the children in the special class was enriched through different ways (Handy and Lindstrom, 1944) and both the groups were evaluated after a period of three years. As a result of a Stanford Achievement Test it was found that both of these groups showed high acceleration but "the special group only slightly more than the control group", and the investigators concluded that "this would seem to indicate that bright children will show acceleration in school subjects whether or not they have special class training". However, they noted that there was marked difference in their respective intellectual development from the qualitative point of view, as was evident from the reports of the junior high school teachers who did not know which child was in which group (Nelson and Carlson, 1945).

In 1953 and 1954, Justman published three reports of his study of two matched groups of intellectually gifted pupils of junior high school level, from 'special progress' and 'normal progress' classes, who were compared in both personal-social adjustment and academic achievement. For the former, they were compared by means of 'standardized group test of personality and a series of sociometric measures', and he found little difference between the two groups (Justman, 1953). For the comparison of academic achievement, both of these groups were tested in the areas of mathematics, science, social studies, work study skills and creative expression in language arts and the experimental group was found superior to the control group At the senior high school level, the difference in the academic achievements between the accelerants (who had completed the junior high school course in two years instead of the regular three) and non-accelerants was minor, and the accelerants were found to have maintained their academic achievement of junior high school (Justman, 1954*a, b*). Consequently, Justman suggested that segregation of gifted pupils in a special class, though of no consequence to their personal and social adjustment, is of "some value" in case of academic achievement. He considered the saving of one year without loss as a strong argument for the retention of special progress class in junior high school organizational framework.

Barbe (1955) did a survey of all the high school graduates of the Major Work Programme in Cleveland, Ohio, between the years 1938–52. Questionnaires were mailed to these people seeking their opinion about (among other things) the influence of the programme on their later adjustment. As a result of this study, he commented that "about two out of three of the respondents . . . believed that the Major Work Programme aided them in making a good adjustment. Whether this means that the others felt the programme hindered them from making a good adjustment or that they did not believe the programme had any particular influence in either way, or both, cannot be ascertained from the data" (Barbe, 1955, pp. 61–62). Flory (1957) discussed an experiment in a special class for the "exceptionally endowed children" in California, and mentioned that the students in special class showed very satisfactory intellectual, emotional and social achievement. She strongly supported the idea of special classes for the gifted.

In 1957, Miller pointed out a drawback in the contemporary research studies. She said that in most of the cases "the evaluation of the success of the programme compares the children receiving a specific type of enrichment with a control group which did not receive it, but in no case have the different plans been tried out on groups of equal ability compared with one another" (Miller, 1957). Fortunately, after two years, in 1959, a study of this nature was done by Abramson (1959). Three representative comprehensive high schools and one special high school were selected for this investigation. The schools and their methods of grouping of the gifted were as follows: (i) heterogeneous grouping of high ability pupils, (ii) honour classes in one or two subjects—less than half, (iii) selected for membership in an 'honour school' assigning them to honour classes for most of their major subjects, (iv) only gifted pupils admitted—on the basis of a special examination [IQ levels: (*a*) 115–24; (*b*) 125–30; (*c*) 135–60]. As a result of this study, Abramson concluded:

> The major conclusion derived from the findings of this investigation is that, when compared by the measures of achievement which were used, no superiority of preparation for college can be claimed for either the special high school or the honour class programme as contrasted with the comprehensive high school which had grouped students heterogeneously. The over-all achievement of students, as indicated by grade point averages and honours, is associated with their level of intelligence rather than with the particular high school they attended (Abramson, 1959.)

It is to be noted that even in this study the effects of enrichment and administrative acceleration were not compared.

Pielstick (1963) referred to a study by Auld (1961), where he compared 58 sixth-grade children in a school, with a comparable group of 56 children in a similar school The former group was categorized while in the second grade by teacher judgment and reading ability into 'high', 'average', and 'low' groups No ability grouping had been done with the second group. Pielstick (1963) pointed out that "she (Auld) reported that there were no statistically significant differences between the Metropolitan Achievement Test scores of the pupils in the two schools at the end of the sixth grade who were in the high or average groups". After reviewing the two studies by Abramson and Auld, Pielstick commented·

> It would seem from these studies that grouping in itself guarantees nothing. What happens after pupils are grouped is probably the crucial matter It may be that carefully planned grouping may facilitate, but not assure, more effective efforts with gifted children (Pielstick, 1963.)

The significance of this statement is worth pondering.

In 1960, Gallagher (Gallagher *et al.*, 1960) did a study of 54 "highly gifted children" (Binet IQ 150 and over) in the elementary grades, who were examined by case study methods. "Each child had an adjusted programme planned on the basis of the individual needs revealed during the case study." Subjective evaluations by teachers and parents showed satisfactory results but objective tests revealed "little, if any, benefit obtained by the group in areas of academic achievement, self-concept, or social status". However, in this study, Gallagher noted that students from low referral schools, were slower than those for high referral schools, and as a possible solution to this problem he recommended that we may "group these intellectually superior children together so that they would not remain in a relatively isolated intellectual environment".

Enrichment

In course of reviewing the literature on enrichment it has been found that reports on actual research experiences are far less numerous than general discussions of this provision. Pielstick (1963) suggested that this paucity may be due to an inconsistency in the definition and scope of enrichment. This opinion of Pielstick about the ambiguity and inconsistency of the term 'enrichment' is also shared by a number of educators (Lessinger, 1963; Bernette, 1957; Barbe, 1958; Lucito, 1963 and some of them have indicated that "this lack of agreement on what the term should really include explains the reason for the objection to enrichment programmes" (Barbe, 1958).

However, no objection against enrichment as such, has been found by the present investigators; rather, almost all the writers have stressed that enrichment is essential for the gifted children irrespective of the administrative set-up, such as special class, acceleration and so on. But, as has been pointed out by Freehill, "enrichment is often limited to mean 'enrichment in the regular classroom'" (Freehill, 1961). And at this point the readers are confronted with different opinions which are more related to the controversy between regular class *versus* special class, rather than between enrichment *versus* non-enrichment. Pregler (1952), for instance, opined that regular classroom enrichment may be disadvantageous because of the lack of time and opportunity of the regular teacher, and because of the possibility that the individual attention of the teacher to the enriched gifted would be resented by his classmates. This view of Pregler, was also shared by Barbe (1958). But the former mentioned at the same time that "here in enrichment in regular class, provision can be made for an unlimited range of abilities and the dangers of social maladjustments are not as serious. If properly planned and managed, programmes of enrichment are more desirable than acceleration practices" (Pregler, 1952).

In 1955, Dunlap (1955) reported a programme of enrichment for the gifted children (IQ = 140 generally), in six elementary schools of Missouri, where these children were grouped in groups of eight to ten and met their enrichment teacher for 40 to 45 minutes twice a week. In a follow-up study of the first 23 of these students to enter junior high school, Dunlap noted that this enriched programme was particularly effective in motivating a substantial number of "'the most able' pupils to make more effective use of their abilities". In 1963, Lessinger and Seagoe (1963) reported a study by Lessinger (1956) in which the "subjects were 56 students. .above 118 IQ in second semester Geometry" in a large suburban high school. They were compared with a matched control group, who had the same instructor, assignments, tests and homework, but not the enrichment practices which were given to the former group. The enriched group showed an equal or better grasp of second semester plane geometry, a greater understanding of mathematics in general, a greater ability to apply principles of geometry to other fields of knowledge and a greater creativity and originality. But they were not superior to the other group so far as the ability to assimilate new mathematical materials or deep interest in mathematics were concerned. However, it seems that systematic studies like these are relatively rare in the area of enrichment.

Conclusion

In conclusion, some basic points may briefly be discussed. It is clear in the light of the preceding discussion that opinion in the field of proper administrative procedure for the gifted is far from conclusive. In acceleration, educators are undecided about the best way to provide it, the amount to be provided, and the grade and IQ level where acceleration would be best suitable, even if they do decide to introduce acceleration in their schools. There is every possibility that one type of acceleration would be better suited for one grade or intelligence level, than the other How would the teachers know the right answer? The same ambiguity clouds the issues of special class (groupings) and enrichment. In the latter, for example, even though the worth and necessity of enrichment for the gifted students are more or less well-established, the answer to the question as to whether it should be vertical or horizontal, is still subject to controversy Some educators think that the enrichment materials should be provided at the grade level of the gifted, others think that there is no use of supplying mere quantity, because only the materials having challenge would be more interesting and beneficial to them. On one point, however. more or less unanimous opinion could be noted. Every person concerned with the educational provision of the gifted, including those who proposed heterogeneous grouping, indicated the same awareness that the Indian educators are showing at the present time, namely, that something special should be done for these individuals. Rex (1952) described a successful heterogeneous class and recommended keeping the gifted children in the regular classroom, but even in this case, enrichment, scopes of individual reading, units and projects were present

It has been further indicated in the foregoing discussions that there is no specific definition or criterion of the 'gifted' in literature. As a result, different researchers have dealt with 'gifted students' of different IQ levels, examined the efficacy of various procedures, and have come to conclusions which, strictly speaking, are by no means comparable to one another because of the different intelligence levels of the populations. Besides, even from simple pedagogic point of view, the difference between the various ranges of giftedness should be considered and examined adequately. This necessity was pointed out by Nelson and Carlson in 1945, who wrote: "One feels that children with IQ's as high as this (IQ 159) really need still another kind of programme from that provided for children with IQ's in the 130's and 140's. It is necessary to do more work along these lines" (Nelson and Carlson, 1945). This necessity still prevails even in the 1960's. The point mentioned by Kirk (1962) also seems to be worthy of consideration by the researchers. He stated that "research studies frequently draw conclusions and inferences for a group as a whole. In the case of gifted children, however, no conclusion can apply to all". This factor should also be noted by future researchers.

At this stage of educational planning in India, it is hoped that this review study would provide some insights into the nature of the complexities in educating the gifted pupils and would perhaps evoke some thought toward the formulation of the nature of provisions for them.

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Reading Ability and Underachievement[1]

Akhilesh K. Srivastava

The study discussed in this paper was undertaken to find out whether reading ability is related to underachievement. The sample comprised four groups of 150 boys each representing the four categories of achievers—under, over, high and low. Three reading tests, measuring speed, vocabulary and spelling, were administered to these four groups. It was found that reading ability, which correlated significantly with achievement, emerged as a factor related to the differential achievement patterns of these groups.

The various aspects of the problem of reading as an end in itself have been investigated very thoroughly; yet the reading skills of underachievers, and how they differ from the high and overachievers in this respect, remain to be similarly explored. The findings of the studies done so far differ. Some of them report that the high and overachievers, in comparison to the underachievers, possess better reading skills (Angelino, 1960; Dowd, 1952; Gowan, 1957*a*, 1957*b*); others fail to find any significant difference between them (Farquhar, 1963; McQueen, 1957; Shaw and Brown, 1957). Diener (1960) even found the underachievers possessing better reading skills than the overachievers.

Many of the past studies have been criticized on several grounds, *e.g.*, for having a very low sample, for their vague and defective experimental design, or for using a method for identifying the overachievers and underachievers that fails to control the effects of measurement errors and regression on the discrepancy scores between the predicted and the actual achievement. The conflicting and inconclusive findings, it has been suggested, are partly due to these deficiencies (Thorndike, 1963). Moreover, most of these studies have sometimes compared the underachievers with overachievers, and sometimes the underachievers with high achievers; this fails to give a global

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and comprehensive picture of the various patterns of achievement representing various segments of ability. Besides, these comparison groups in the contrasting group design give rise to different problems (Thorndike, 1963). For these reasons, it is always a better procedure to compare all the four patterns of achievement; this will also bring to focus the characteristics of the underachievers as compared to the other four patterns.

In order to see whether reading ability is a factor related to underachievement, it was therefore considered desirable to plan a fresh study involving the comparison of the reading skills associated with the four patterns of achievement, endeavouring at the same time to avoid the pitfalls into which many studies have fallen. Moreover, the lack of Indian studies on this problem, and the fact that there has been only a limited application of foreign studies to Indian conditions further suggested the need for a fresh study.

METHOD

Sample

The four groups—underachievers, overachievers, high achievers and low achievers with 150 schoolboys in each, were selected out of a random sample of 1837, obtained from students of Classes X and XI on the basis of their scores in three tests of ability; Mohsin's (Undated *a*, Undated *b*) Verbal Intelligence Test and Science Aptitude Test, measuring verbal comprehension and numerical facility respectively, and Raven's (1960) Progressive Matrices Test, measuring abstract reasoning. These tests served as the predictor variable, and the average of examination marks, obtained in the various academic subjects in six consecutive examinations, served as the criterion variable. The top 27 per cent in ability tests but below the average in achievement and *vice versa* comprised, respectively, the underachieving and overachieving groups. Again, the top and the bottom 27 per cent, both in ability and achievement, defined the high and low achieving groups respectively.

Instruments

Three reading tests were used: (i) a Hindi adaptation of Greene's (1937) Michigan Speed of Reading Test; (ii) Sharan's (1964) Hindi Vocabulary Test prepared for senior high school students; and (iii) Mohsin's (Undated *c*) Hindi Spelling Test. These tests were administered to the four groups of subjects. A high score on each of these tests denotes better reading skills. The scores obtained on these tests were added together to form a composite score, measuring general reading ability.

Analysis

Separate analysis was done for the composite score and for the three reading tests. The data were treated by the method of analysis of variance, and the t-test was further used to identify the groups that showed significant difference. Bartlett's test was also used in order to satisfy the assumption of homogeneity of variance (Guilford, 1965). In addition, phi-coefficients were worked out between reading ability (composite score) and achievement, and reading ability (composite score) and general ability

RESULTS

All the B values, except for the vocabulary test scores, were significant ($p < \cdot 01$); this, ordinarily, would not satisfy the assumption of homogeneity of variance for using analysis of variance and the t-test. It was decided, however, to use these tests as the sample covered in the present study was very large and the four groups were of equal size, this decision was taken also on the strength of some reported evidence supporting the application of these methods even under such conditions (Boneau, 1960; Edwards, 1960; Wert, Neidt and Ahmann, 1954).

All the F-ratios ($df = 3/596$; $p < \cdot 01$) were significant, which showed that the four groups differed significantly on all the measures of reading ability.

Table 1 gives the means and standard deviations of the four groups. On each of the three tests as well as on the composite score, the high achievers appear to have the best, and the low achievers the poorest, reading skills. The overachievers and underachievers come in between, with the former scoring higher than the latter on all the measures, except reading speed test.

TABLE 1

Means and SDs of the four groups on the reading tests
(N for each group is 150)

TEST	UA		OA		HA		LA	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Reading tests (Composite score)	81·60	18·70	86·00	24·20	112·70	19·50	53·80	14·70
Reading speed	33·08	10·44	32·24	13·14	45·08	11·52	21·38	7·02
Vocabulary	31·00	8·65	33·95	9·25	42·45	7·50	20·60	7·90
Spelling	17·42	6·04	19·94	7·48	25·18	6·72	12·38	5·24

UA = underachiever; OA = overachiever; HA = high achiever; LA = low achiever.

Table 2 presents the significance levels of inter-group differences. In all the comparisons, the differences in the means of the groups were significant ($p < \cdot 01$), except those between overachievers and underachievers, who differed significantly neither in the composite score nor in the speed test.

TABLE 2

Significance of inter-group differences between groups

GROUPS COMPARED	COMPOSITE SCORE		READING SPEED		VOCABULARY		SPELLING	
	t	P	t	P	t	P	t	P
UA *v*. OA	1 76	NS	·62	NS	2·84	·01	3·23	·01
UA *v*. HA	14·07	01	9·52	·01	12·31	·01	10·63	01
UA *v*. LA	14·33	·01	11·47	·01	10·95	·01	7·75	·01
OA *v* HA	10·51	01	9·04	·01	8·76	·01	6·39	·01
OA *v*. LA	13·94	01	8·29	·01	13·35	·01	10·22	·01
HA *v*. LA	29·65	·01	21·56	·01	24·83	·01	18·55	·01

The phi-coefficient between reading ability (composite score) and achievement was ·60, and between reading ability (composite score) and general ability was ·61; both these phi-values were significant ($p < \cdot 01$). There is a contamination of the general ability factor in the relationship between reading ability and achievement, which considerably underscores the high value of correlation between the two.

DISCUSSION

Reading ability is found to be an important factor related to the differential achievement patterns of school-going pupils; this is evident from the significant F-ratios ($p < \cdot 01$) which significantly differentiate the four criterion groups, and the significant phi-coefficient ($p < \cdot 01$) between reading ability and achievement, which indicates a positive relationship between the two.

The significant differences found in the reading abilities of the underachievers and high achievers, high and low achievers, and overachievers and low achievers are in the expected direction, and they all emphasize the important role that reading ability is likely to play in achievement (Table 2). However, the significant differences that have been found between the underachievers and low achievers, and high achievers and overachievers were not expected (Table 2). But when the high correlation of ·61 between reading ability and intelligence is considered, the fact gets easily explained. Both the high achievers and underachievers are superior to the low achievers and overachievers in intelligence; and since the two tests have much overlap, as indicated by the high correlation, this difference in intelligence should influence their relative positions in the reading ability tests.

The insignificant difference between the underachievers and overachievers is, however, most unexpected (Table 2). In view of the superior achievement of the overachievers, despite their inferior intelligence, it was expected tha they would possess better reading skills than the underachievers; in fact they should have come nearer to the high achievers. But the high correlation between reading ability and general ability explains this unexpected finding also. The common components between these two tests are positively helping the underachievers to score high and negatively influencing the overachiever to score low in the reading ability tests. Nevertheless, the correlation between the two, though high, is far from perfect, which indicates that the reading ability tests also measure some factors not tapped by the general ability test. These independent components are leading the overachievers to score high and the underachievers to score low on the reading ability tests. The reading ability scores of the two groups are thus counterbalanced; this prevents any significant difference coming up between them, though, as expected, the overachievers score higher than the underachievers (Table 1). In fact, in vocabulary and spelling tests, the overachievers are significantly superior to the underachievers (Table 2). This shows that for achieving high in heavily verbally-loaded school curricula, a good knowledge of vocabulary and spelling is needed, as the answers have to be written in language; therefore, the overachievers, by dint of their superior knowledge in these areas, achieve significantly better than the underachievers.

The highly significant correlation of ·60, between reading ability and achievement, would have considerably diminished had the ability factor been partialled out; as a result, the contribution that reading ability makes to achievement would have been minimized. However, the significant difference in reading ability between the high achievers and underachievers (despite the fact that they are almost equally high in intelligence) and the insignificant difference between the underachievers and overachievers (despite the fact that the former are significantly superior to the latter in intelligence) show that reading ability influences achievement independently of general ability. Reading ability, therefore, is a factor in achievement, though the correlation between the two may not be as high as reported by the present investigation.

CONCLUSIONS

On the basis of this study, the following conclusions could be drawn about the reading skills of the underachievers, as compared to the other patterns of achievement:

1. First, in comparison to the high achievers, underachievers are slow readers, and as speed and comprehension are related (Tinker, 1932), they also

lack the capacity to derive much meaning from what they read. The high achievers are more familiar with, and can give more thought to, what they are reading.

2. Secondly, the underachievers, in comparison to both the high achievers and overachievers, are poor in their stock of words; consequently, they lack the power of expression, and whatever they express is full of spelling mistakes, as they are poor at spelling too.

3. Both these factors—poor speed and comprehension, and the poor power of expression—seem to be related to the poor achievement of the underachievers.

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Cost and Quality of School Education: A Review of Researches

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The author critically reviews significant researches in the field during the period 1920–1963 and suggests considerations that should guide further research.

The field of cost and quality in education has fascinated a large number of research workers during the last fifty years Because of its complexity, it involves some of the following issues:

1. *Formulating criteria of quality in education.* Educationists usually do not agree on what quality of education is and this has made the description of the concept a difficult task. Researchers in the field were rather free in enunciating their own definitions of quality and therefore they defined it in a number of ways. So much so that, if the relationship between cost and quality was found significant or otherwise, it explained hardly anything beyond relating a particular aspect of quality to costs which were, again, generally not uniform.

   There are numerous ways in which quality of education has been described Meaningful spade work about the concept has been provided in the publication of the New York State Education Department, the Institute of Administrative Research, the National School Boards Association and the American Association of School Administrators. Quality has been described "as a relative description of the school systems' effectiveness in meeting specifically defined objectives" Within this context, improvement in the quality of schools can best be described in terms of improvements, either in the processes of education or in the products of the schools. The advocates of the 'process' approach to quality improvement lay emphasis on individual attention, environmental improvements, realistic organization and presentation of educational programmes, greater variety in courses and opportunities offered for the development of special skills and talents in pupils, and skilled teaching. The studies reviewed in this paper, and especially those reported by Mort, Vincent and the

New York State Educational Conference Board provided specific data on which these directive statements are based.

The protagonists of the 'product' approach to quality of education usually use achievement scores of pupils as the basis for rating the school system—a quantitative criterion of quality.

2. *Controlling factors other than schooling which affect quality.* The pupil's intelligence, motivations, physical and mental health, the socio-economic background of his family, and regional differences and the community culture may have to do a lot with his performance in a school situation. Therefore, in a study on cost and quality of education, if such intervening variables are not controlled the validity of the conclusions arrived at may be contested.

3. *Obtaining uniform and comprehensive cost data.* Some of the expenditure heads maintained by educational institutions are so diverse that they cannot be considered comparable. The main problem in the area of cost analysis is to define various items of expenditure clearly so that comparable answers may be obtained. Then there is the problem of identifying the categories of expenditures which are most commonly found in the highest quality schools. What does education cost? This is not such a simple question as it appears to be. Broadly, the elements of cost of educaton may be : (*a*) private cost, *i.e.,* cost borne by the parents/guardians or on their behalf by the pupils themselves in exceptional circumstances; (*b*) opportunity costs, *i.e.,* the earnings forgone by the pupils (of certain minimum age) while attending schools; and (*c*) institutional costs, *i.e.,* the costs incurred by the institutions on land, buildings, playgrounds, equipment, furniture, library books, etc., (capital costs) and teachers salaries, salaries of non-teaching staff, school contingencies, science contingencies, current expenditure on library service, co-curricular activities and auxiliary services, etc. (current costs).

The real costs, social costs, opportunity costs and private costs have generally not been computed for the purposes of the cost-quality relationship. Generally for purposes of comparison, unit-pupil institutional costs have been worked out by dividing the total yearly costs by the number of pupils being served by the school. In so doing, current costs and capital cost are first separated. To the current costs amount, considered replacement cost in respect of capital costs has been added, and the average daily attendance has served as denominator. It may be seen that this is far from what is actually required. For instance, there are some categories of expenditures in education which besides being educational in nature are more than that, *i.e.,* establishment and maintenance of museums, art galleries, etc. Besides, there may be certain educational services being provided by the administrative departments of Community Development, Defence, Labour and Employment and Information and Broadcasting which need to be accounted as educational costs.

4. *Controlling factors other than finance, which affect the school.* For example, the teacher's competence in the subject-matter, and the motivation and involvement with which he handles the instructional situation need mention in this connection. Furthermore, with the same amount of human and material resources, the affairs of the school can be managed within a wide range of difference depending upon the personal *and professional qualities of the head of the institution and other* staff members.

Hence the complexity of the relationship is obvious. In the review of some 25 research studies which follows, it has generally been established that schools with high quality spend more money per pupil than schools poorer in quality. Nevertheless, it has been found that though quality schools have to spend more money per pupil yet more increments in costs per pupil do not lead to increase in 'quality' in a school system. Erudition on the subject has contributed to the development of insights into the nature of the problem, yet we are far away from significant conclusions in this respect. There may be various reasons for this. Among others, comprehensive identifications, generalized descriptions, over-simplified concepts, insufficient research designs and inadequate (but readily available) instruments were the features of some such studies. There has generally been a need for a precise and scholarly approach in such studies, for such an approach only has characterised a significant breakthrough in research in other fields. Perhaps in the very process of improving the methodology of research in this field lie the ingredients of quality improvement programmes in Indian schools.

Some research studies

There have been many attempts to measure the quality of education and to relate it to cost. These studies may be classified into following four categories :

1. The earlier studies which depended on efficiency indices like those developed by Ayres, Norton, Ferrell, Mort and others.

2. A second group of studies have attempted to relate the level of school expenditure with the pupils' achievement scores on standardized tests in respect of different subjects and basic skills in elementary and secondary schools.

Studies by Powell, Grimm, Bloom and Statler, and a Connecticut study are worth mentioning in this connection

3. A third category of researches which claim methodological promise, especially as far as measurement of educational quality in comprehensive and valid terms is concerned, has been developed by Mort, Vincent and Newell, Mort and Cornell, Grace and Moe, Strayer, McLure, Smith, Griffs and the New York State Education Department. In studies of this category, quality is measured with the help of a carefully formulated rating instrument. The instrument purports to rate the processes of schools, judging the extent to which the entire education in school is based upon the findings of modern psychological research and upon the analyses of the educational needs of society.

4. Other studies dealing with miscellaneous aspects of the cost-quality relationship.

Some of these studies may now be examined briefly.

A. *Expenditure and educational activity/facilities*

Ayres (1920) for the first time reported a study of school expenditures and of certain provisions for education in all the States of the U S.A. from 1896 to 1920. He found a significant correlation between the level of expenditure and such items as . (i) percentage of school-age population attending schools, (ii) length of the school year, and (iii) average daily attendance, etc.

Norton (1926) in an analogous study "The Ability of States to Support Education" found that the financially well off states spent more money per pupil and quality in terms of percentage of literacy, teachers' salaries, expenditure on non-salary items, and that the experience of the teachers, etc., was higher in these states than in the poorer states

It may be pointed out that this was perhaps merely verifying the fact whether there existed a correlation between effort in the form of expenditure and achievement in the form of educational activity in the states. Providing evidence that high educational activity in respect of these items was accompanied by high financial figures in all the states was but an humble beginning, these studies were by no means cost-and-quality studies.

Ferrell (1937) in a study entitled "Relation Between Current Expenditures and Certain Measures of Educational Efficiency in Kentucky Country and Graded School Systems" found a strong relationship between quality and expenditure when quality was defined as: (i) the attracting and holding power of the schools; (ii) the training and experience of teachers; (iii) pupil-teacher ratio; and (iv) the school year.

Ferrell concluded that there existed a very definite relationship between total current expenditure and educational "efficiency" thus defined. Ferrell at least introduced an element of quality in the form of the above-mentioned four variables. But a word of caution would be in order here. The concepts of quality of education and efficiency of education should have not been mixed in this as in many other studies. There may be in a school situation some level of quality at some specific level of efficiency. While efficiency is regarded as the total production per unit of time, quality is the characteristic of the unit produced. They are therefore distinct and may be regarded as such.

While studying the financing of the public schools of Maine in 1934, Mort (1934) reported that high-expenditure schools generally made adequate provisions for textbooks, instructional supplies and libraries. This evidence is of some value though limited. The flaccid point here that has often been raised is the assumption that enough trained teachers and more teaching facilities result in better educational quality. Thus a crucial aspect of quality of education was assumed rather than substantiated by his study. The actual educational returns were not measured at all.

B. *Expenditure and test scores*

Powell (1934) conducted a study on "Educational Returns At Varying Expenditure Levels." It was a longitudinal study aiming at the relationship between school expenditures per pupil and pupil achievement. He gave tests both in school subjects and of general mental ability. He matched students of equal mental ability in low- and high-expenditure schools. He thus eliminated mental ability as a cause of difference in achievement. Powell found that pupils in the top-expenditure schools were on the average superior to those in the low-expenditure schools in all the nine phased school achievement measures. It was therefore inferred that schools in the lowest-expenditure groups were getting a significantly lower educational return on each unit of expenditure compared with those in the top groups.

Grimm (1938) studied in detail the phenomenon of educational opportunities in relation to their costs in 24 elementary school districts in Illinois. He compared levels of expenditure with scores on tests of pupil achievement and with the type of educational opportunity provided. A direct relationship between cost and quality in education was established.

The Committee on School Education of the Connecticut Citizens (1957) for Public Schools in their report indicated that more money *per se* did not necessarily provide better education. It was a significant finding which was at variance with the other literature on the subject. It stressed the necessity to isolate the crucial factors controlling the quality of education. Similar results have been arrived at by a study on Delhi schools by Harbhajan Singh (1967). The criterion of quality of education applied was the performance of pupils as judged by marks secured in the higher secondary examination. The school costs taken into account separately were instructional, administrative, auxiliary, co-curricular and library costs. The multiple regression model, with quality as the criterion-variable and the above-mentioned five categories of per-pupil costs as predictive variables, was applied. It was found that no significant cost-quality relationship existed.

The study suggests the plausibility of the operation of some intervening variables like the morale of the teachers, the professional skills of the principals in organizing and managing school affairs and the low reliability of the examination system. It was therefore suggested that for a more profitable study in Indian conditions all the relevant factors which intervene, should be conceptualized, indentified, described, measured and controlled.

Bloom and Statler (1957) were engaged in an extensive study concerned with the factors associated with educational achievement as measured by standard tests of 'general educational development' (GED) in English Composition, Social Studies, Natural Science, Literature and Mathematics. Tests in these areas were designed to measure the attainment of some of the ultimate objectives of the entire programme of general education. Tests were given to 35,330 seniors in 814 high schools in 48 states by E. F. Lindquist in 1943 and to 38,773 pupils in 834 high schools in 48 states by B. S. Bloom in 1955.

1. The differences among the states on tests of GED were as significant in 1955 as in 1943. Although they had the same amount of formal education, the high school seniors in the lowest states were at a great disadvantage when compared with the seniors in the top states.
2. There appeared a significant relationship between scores of GED tests and financial support for education on the one hand and level of formal education in the adult population on the other. The latter may be due to the value placed upon education as reflected by the educational status of the adult population.

Bloom and Statler (1957) appraised the importance of other factors besides expenditure on pupil achievement. It was pointeed out that teaching personnel and school facilities were only means for achieving quality in education. They did not measure quality. Similarly, standardized tests measure only a fraction of what the terminal behaviour of the pupil who has spent one school year is supposed to be.

C. *Expenditure and quality rating instruments*

A number of studies for working out the cost-and-quality relationship developed their respective guides for judging quality as the extent to which the educational programme of a school is based upon the findings of modern psychological research and upon analysis of the educational needs of society. Mort, Vincent and Newell (1946) prepared one such instrument. Among others the check list which had 64 items for elementary schools and 85 items for secondary schools included: (i) provision for teaching the basic skills according to tested procedures; (ii) provision for teaching fundamental areas of knowledge with proper emphasis on their scope and meaning; (iii) provision for identification of the talents of individual pupils and providing learning situations accordingly; and (iv) provision for the development of certain fundamental behaviour patterns such as good citizenship, ethical character and ability to think. Mort and Cornell (1941) inferred that money was. the most important factor in educational adaptation. They also warned that money was by no means the only factor. Nevertheless it was more closely related to such a programme than any other single factor. Grace and Moe (1938) revealed considerable correspondence between cost and quality which became substantial when the factor of sparsity of population was partialled out It was found that no low-cost district got distinctly superior educational returns and that educational efficiency could not be achieved without high expenditure.

The Commission on the Legal Structure of Rhode Island Public Education (19) studied educational returns for money spent on schools. They used the instrument developed by Mort and Cornell on high, medium and low per-pupil expenditure schools. Improved practices in schools were found to be most common in the high-expendiure group of schools and least common in the low-expenditure groups. This study also recognized that a number of factors other than expenditure were involved in producing a school of high quality. Whatever the other conditions may be, they were not found sufficiently strong to offset the lifting effect of expenditure.

Strayer (1945) studied the problem on a sample of 138 large elementary schools in West Virginia which were classified into three expenditure groups. He used a check list of several hundred items. Strayer concluded that "the quality and breath of educational offering of the schools in the high-expenditure level are considerably greater than in those not so well supported".

McLure (1948) in his study of about 100 Mississipi schools used a check list of 200 school practices. The schools were divided into three expenditure categories. His findings revealed that low expenditure resulted in serious losses in educational returns.

A study by the New York State Educational Conference Board (1945) on over 100 schools, using standardized tests and observing classroom practices and procedures, concluded that top-expenditure schools averaged highest in educational achievement as measured by the tests. Specifically, the top-expenditure schools at the sixth-grade level on the average exceeded the lowest-expenditure group by a year and a quarter in arithmetic, a year and seven months in reading vocabulary, a year and eight months in reading comprehension. The schools that had most comprehension as well as achievement in school subjects spent most per pupil. These schools were using more effective teaching methods. They were making better use of books, radio and television. They were providing courses in music, art and dramatics. The study concluded that "schools which achieve the highest mastery of essential skills and do the most to promote all objectives, cost the most".

Smith (1954) in a cost-and-quality study on 229 central rural schools in New York State attempted to find a relation between school quality (through a check list observation) and the following five major characteristics:

(i) Quality of administration,
(ii) Size of school system,
(iii) Type of community,
(iv) Geographic location,
(v) Level of expenditure.

He found that item (v) was more closely related to school quality than any of the other four characteristics. Griffe (1955) studied school facilities and procedures at three levels of expenditure in 44 school systems in south-east Texas. The schools were rated by direct observation on 100 modern educational practices. It was reported that educational services consistently increased with increased expenditures.

The New York State Education Department (1963) developed methods for assessing the quality of a school system in a quality measurement project. The project yielded significant data on the cost-quality relationship in education. The first phase of the project was conducted in 100 schools. Two measures of quality were: (i) two batteries of tests (Iowa test of basic skills, and Iowa test of educational development); (ii) a set of tests for secondary schools to measure understanding of basic social concepts, background in natural sciences, appropriateness in expression, ability to do quantitative thinking, ability to interpret reading material in the social studies and in the natural sciences, ability to interpret literary material, general vocabulary, and use of sources of informations. The tests were given to 27,692 fourth-grade pupils in elementary schools and to 27,178 seventh-grade pupils in junior high schools. Among the significant conclusions of the study was the existence of a strong positive relationship between the level of per-pupil expenditure for instruction and the scores on the Iowa tests, both at the fourth- and the seventh-grade level. The relationship held good even when the effect of parental and community influences on the educability of pupils were eliminated.

The second phase of the project made use of "The Growing Edge"—an observational check list developed by Mort, Vincent and Newell (1946). It was found that there was a strong and positive relationship between educational expenditure and the ratings of trained observers on general educational effectiveness.

D. *Some other studies*

Encouraged by the conclusions of cost-and-quality studies, Woolatt (1948) undertook an exercise on the operation of the law of diminishing returns among the highest-expenditure-level schools in the U.S.A. His results, however, denied any such possibility.

With Brickell (1958) a further question arose, *i.e.,* the possibility that there could be certain small-expense items which were responsible for raising school quality. Brickell found that small-expenditure items had a considerable relationship to quality. Brickell's findings suggest that good schools do not spend more money on everything. There is a high correlation between some items of current expense and quality of education; the correlation with other expense items is low. Brickwell emphasizes the importance of discrimination in allocation of budgetary items for quality optimization.

An interesting study by Furno (1956) is concerned with the relationship between school quality and level of expenditure over a period of 25 years. He found that the cost-and-quality relationship is cumulative. An important policy conclusion is thus evident, *i.e.,* for developing quality schools an intelligent, long-range policy for their adequate financial support is essential.

The findings of studies on cost and quality relationship have been summarized several times. The work of Mort (1952), Ross (1958) and Clark (1963) is to be noted in this context. Ross (1958) emphasized that school quality is an exceedingly complex concept and that a number of factors affect the cost-quality relationship. He points out that all areas of school performance do not necessarily improve with increased expenditure.

Scope for further research

It seems from the brief review attempted above that the researches so far have provided useful hypotheses which need to be substantiated. Among others, further research in this direction may fruitfully take note of the following considerations :

1. Quality at a point of time is likely to be related to expenditure over a period of time than to expenditure at the given time.
2. A positive relationship between quality and part expenditure-levels will exist only when the level of expenditure is the result of sound budgeting of resources. A high expenditure-level resulting solely from non-productive expenditures could not be expected to result in high quality.
3. A positive relationship between quality and past expenditure will not result from the expenditure factors alone but from a combination of expenditure factors and other essential factors.
4. These other factors may produce high quality without a high expenditure-level to the extent that able personnel can be recruited, retained and stimulated to do a good job without monetary incentives.
5. A specific problem which needs thorough examination in Indian secondary schools is the effect of specialization (greater division of work) among the teachers with respect to subject-matter areas upon the quality and efficiency improvement in the school situations. This factor has long since been recognized in economics but its contribution in school productivity and quality still remains to be seen in a systematic study.

The studies reviewed here have tended to substantiate the correlation between various measures of school quality and expenditure levels. Two studies stand at variance with these results The general conclusion stands that high expenditure schools tend to produce high quality. This poses problems of identifying the right combinations of factors to produce high quality and finding means to bring about these combinations in poor quality schools.

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Traditional Values of the Indian Society and College Students[1]

S. P. Ruhela

The author reviews the significant studies in the sociology of students' values in India and reports an empirical study conducted by him on a sample of college students drawn from some institutions of higher education in Delhi. This study reveals that in spite of their middle-class and even upper-class origins, urban living, modern education and awareness to modern values, the college students of Delhi are dominated by the traditional Indian values in their actual behaviour.

The sociology of values has been one of the most attractive fields of study in India during the last twenty-five years or so. A number of sociologists have enriched this field by their contributions to theory and by their empirical studies. Outstanding for its contribution to Indian society is the work of Radha Kamal Mukerjee (1949) and R. N. Saksena (1965, 1967).

Since values have a kaleidoscopic nature, sociologists have been interested not in one but in a multiplicity of their dimensions. The study of values of individual communities has been an established tradition for the sociologists and social anthropologists in this country. Of late, however, there has been a phenomenal tide of thinkers and researchers in the sociologies of innovation, modernization, social tension, personal and social disorganization, community development, family planning and so on, all of which may, for the sake of convenience, be put under the umbrella of the sociology of social change in India.

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[1] This study was undertaken in the Department of Foundations of Education, National Institute of Education, during 1966–67.

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The sociology of the values of Indian students: A review of studies and writings

In the field of sociology of education, sociologists and interested educationists have shown their concern for studying the values of the Indian society *vis-a-vis* its students and teachers. So far as the values of the Indian teachers are concerned, only a few studies are available; but on the values of the Indian students, we have a number of studies and writings.

While the values of the students at the school stage have been studied in only three significant empirical investigations carried out by I. P. Desai (1953), Bhatt and Advani (1966), and B. G. Desai (1967), no less than a dozen studies concerned with the values of college students, directly or indirectly, are available. Besides these, we come across a number of writings by sociologists, educationists and other social scientists which add to our knowledge of the values, value tensions and problems of Indian college students.

The earliest theoretical contribution to the sociology of students' values came from D. P. Mukerji (1946) of Lucknow University in his book *Problems of Indian Youth: A Collection of Papers.* With his characteristic sensitivity, clarity and brevity of expression, Mukerji has presented in six papers, which were more or less the full text of speeches delivered to the students of his University, an excellent sociological analysis of the values, value conflicts and other problems of the Indian college youth actively involved in the national struggle for independence during 1939–45. As a university teacher closely associated with the students, he was able to observe and feel intimately the upsurge of new aspirations and, at the same time, the growing intellectual suppression and emotional frustration and discontent among them resulting from their failure in their progress towards the creation of a new social order in the country. He remarks on the "marginality of the Indian youth" hovering between "a world that is dead and another that is afraid to be born", and his analysis of the causes of value-conflicts in the college students holds good even today.

The pioneering empirical study concerning the values as well as the socio-economic conditions of high school students was done in Poona by I. P. Desai (1953). His study was confined to the students of senior classes of the city high school. He studied the impact of several social factors like residence, caste and the effect of the occupation and economic condition of the householders on their school-going wards. As he himself has rightly pointed out, the most striking feature of the results of his study was "....in opposition to popular notion, the students' voluntary acceptance of family regulations.... It seems that the pattern of the students' relation to his locality, *via* his family and his caste is based on the same principles as those of the village communities in India."

John Useem and Ruth Hill Useem (1954) studied the values, attitudes and roles of 110 Indians of the Bombay Province who had received higher education in the West and had returned to India between 1938 and 1953. The case-study method was used in this interesting study which showed a great deal of Western impact on the attitudes and values of the respondents.

Margaret Cormack (1961) in her empirical investigation, *She Who Rides a Peacock,* studied the awareness, values and attitudes of the college and university students towards social change related to 'traditional' India becoming 'modern'. This study was conducted by her in about twelve university departments or colleges, chosen from throughout the country, through questionnaires and interviews. In all, 404 students (234 males and 170 females) in the final B.A. year or doing their post-graduate studies were included in this study. The study has revealed mixed responses from the students—in favour of as well as against the traditional values. Despite its disappointing lack of methodological rigour, this study is of much help in understanding the values and attitudes of our college youth. The over-all conclusion that can be derived from the study is that the college youth are still greatly under the influence of their traditional social institutions.

Edward Shils (1961 *a, b*) contributed a very interesting paper: "Indian Students: Sadhus rather than Philistines" (1961 *a*) and an observational study, *The Intellectual Between Tradition and Modernity: The Indian Situation* (1961). He has presented a brilliant sketch of the values and attitudes of the Indian college students in both these works. He has, in particular, underlined the passivity, uncreativity and lack of scholarship in them and also attempted to discover the causes of unrest in the students and teachers of the higher educational institutions in this country. Although Shils' analysis and some superficial remarks have annoyed several intellectuals in India, yet they certainly have had a very stimulating effect on our students and teachers. Shils' studies are, undoubtedly, landmarks in the history of sociological research on the values of Indian students. However, it must be pointed out that his work, lacking as it does in any methodological rigour, is mainly impressionistic. As such, one often finds that while he has highlighted the weaknesses, failings and difficulties of the Indian college students effectively, he has not been able to assess properly the other side of the picture.

B. V. Shah (1961) surveyed the opinions of a sample of college students of Gujarat on occupations, friendship, inter-dining, caste endogamy, etc. On the basis of this study, he concluded that caste-consciousness had not weakened among the students belonging to the upper castes in his State.

B. V. Shah (1961, 1964) later presented a full-dress study, "The Social Background of the Students of the Maharaja Sayajirao University, Baroda" (1961) as a doctoral thesis in sociology based on structural interviews conducted by him during 1957–58. The same study was published under the title, *Social Change and College Students of Gujarat* (1964). Shah studied 200 Hindu Gujarat male students (20 per cent random sample) of the Baroda University. This was the first systematic study of Indian students after I. P. Desai's (1953) monograph on Poona high school students. Shah studied the non-verbal behaviour of the students in nine social situations, *viz.*, caste endogamy, joint family, gainful employment of married women, adult boy-girl relationship, caste commensality, when he marries, selection of bride, livelihood place and occupation. The first two have been treated as central situations while the rest as the peripheral ones. The responses were measured on a three-point scale, one end of which denoted conformity to the traditional norms in these situations and the other non-conformity; there was a mid-point between the two. Shah concluded that his respondents had remained fully or highly traditional in the central areas concerning joint family and caste endogamy. A close examination of his data, however, shows that it does not fully support this conclusion. His conclusion that "the traditional values still hold considerable sway and the traditional institutions still perform some useful functions" does not appear to have emerged clearly in the study. However, this study has presented a valuable data on the sociographic characteristics and values of the college students and has thrown up some interesting hypotheses explaining the causes of student unrest in the country.

Humayun Kabir (1961, 1962) has focussed on the melancholic mood of the Indian youth in the existing period of transition. In an impressionistic vein, he has written about the attitude of negation and cynicism rather than of rebellion in Indian youth. According to him, they reveal the tendency to run after unrealizable goals, and the three elements which cause the greater ferment in them are: ideas of nationality, socialism, and a sense of frustration and purposelessness. In a brief summary of the causes of student unrest and the remedies suggested by him appended to the *Report of the Committee on Students' Welfare and Allied Matters* (1967), he has emphasized the loss of idealism, passivity and lack of any special aptitude for higher studies in the college students.

An empirical study of the values and attitudes of Indian youth was conducted by the World Assembly of Youth, India (1963). It was based on the responses of 1578 randomly contacted youths (both collegiates as well as non-collegiates, although their respective numbers have not been mentioned), in the age-range 16 to 30 years, throughout the country. The purpose of the enquiry was to study the basic sequences and directions of development as shown in the behaviour of youth towards the values of life in the following areas: aspects of the individual's personal life, images and aspirations; stimuli dealing with the dynamic factors in the personality of the individual and how he sees and directs his life; and the reactionary tendencies or overt behaviour of an individual. The enquiry was conducted on the basis of three central points, namely, sex, age and membership of youth organizations. In spite of a lot of tabulated data, the study has not been able to arrive at any conclusion. This failure has been mainly due to two reasons: an important basis, that of education, was not taken into consideration; and no methodological rigour was observed. The data pertaining to the different age-groups was also not subjected to any proper comparative analysis. The investigators did not even mention the exact numbers of each category of youth, whether on the basis of age, sex or education, and the places or areas in India where this study was conducted.

An intensive study of the attitudes, values and problems of 35 female (half of the total number) under-graduates of the Raj Rishi College, Alwar, Rajasthan, was conducted by a team of 15 sociology students during the year 1962–63 (Ruhela, 1963). Each investigator used an interview schedule relating to one aspect of the study. Most of the respondents (ranging from 36 per cent to 58 per cent) 'disagreed' on a five-point scale in case of items like: Hindu girls are not interested in their parental property, undesirability of women entering services, restrictions on widow remarriage, death-feast, *purdah* system, restrictions on inter-caste marriages, too much expenditure on marriages, not allowing the would-be life-partners to meet before marriage, giving alms, and undesirability of co-education. They have disagreed most with the social institutions of dowry, child-marriage and bride-price. Most of the respondents have revealed that they wish to enter service, the medical profession being the most favoured one for respondents belonging to the science faculty and the teaching profession for the Arts students. Political dissensions, language controversy, casteism, religious differences and untouchability, in the descending order, have been mentioned as the main obstacles to the achievement of national integration in the country. The study has revealed that in their leisure-time the majority of the girls see 'stunt' or romantic films, sing film songs, write stories, read the daily papers and novels, listen to the film music broadcast by Radio Ceylon, talk about other girls, cook food, and enjoy tea in the college canteen—but, of course, all this in the company of girls only. These responses clearly show that the attitudes, values and actual behaviour of the female collegiates in the sample have become modern to an appreciable extent due to their college education.

An interesting study of social distance observed by college girls was conducted by two psychologists, P. Nataraj and N. S. Murthy (1963). A total number of 165 students of the Maharani's College, Mysore, belonging to the Brahmin, Lingayat, Vokkaliga, Vysya, Harijan, Coorgi, Sindhi and Uru communities were included in the study. It was found that the Vokkaliga and Sindhi girls were less conservative and they expressed the least social distance towards others, while greater social distance was expressed by others towards the Sindhis, Vokkaligas and Coorgis.

In his paper, "Crisis in University Education", M. S. Gore (1965) has brilliantly analysed the factors responsible for the low intellectual values and disinterestedness in the students of undergraduate colleges in India in general. His portrayal of the typical Indian undergraduate is a classical one. According to him:

> The poorly motivated, self-denigrating student follows his own routine and rhythm. He attends college regularly, puts in the required attendance but does not study. He has no set purpose....The college is his hang-out. He enjoys the sheltered freedom and the newness of his environment but he soon tires of it, because inside him he is worried and helpless. He stirs himself into activity three months before a University examination, burns midnight oil, nervously completes the examination and awaits the result....The non-creative teacher and the unenthused student are apt counterparts of each other. (Gore, 1965.)

Very few college teachers in any part of the country will be able to refute the truth contained in this intellectual portrait of the average Indian undergraduate of today.

The problem of values *vis-a-vis* the education of college students has been briefly discussed in *Climbing a Wall of Glass: Aspects of Education,* edited by three educationists J. W. Airan, T. Barnabas and A. B. Shah (1965). P. N. Mathur sees the main problem in our overemphasis on Western materialism which he wants corrected by Eastern spiritualism, while A. B. Shah feels that "the dominant Indian tradition and the attitude of life....are, by and large, antithetical to the emergence of a modern society".

Yogendra Singh (In Shah, 1965) while discussing the role of elites and intellectuals in India informs us that "according to the Indian tradition, the elite could only interpret and not innovate". India's contact with the West during the nineteenth and twentieth centuries has resulted in the emergence of three patterns: "first, total rejection of a small group of traditional thinkers and the rise of revivalist leadership; second, the movement for complete acceptance, which was a short-lived process; third, the effort to bring about a synthesis between the Western and Indian traditions, which was the strongest".

Wilfred Cantwell Smith (1965) has also made certain comments on the values and attitudes of the Indian intellectuals (college students included therein). His exposition reveals scanty information on the subject.

Aurthur Koestler (1960), V. S. Naipal (1964), Ronald Segal (1965) and Nirad C. Chaudhuri (1966) have in their own respective ways tried to analyse the socio-psychic and cultural make-up of the Indian intellectuals in universities and colleges. They seem to be agreed on the illogicality, ambivalence, schizophrenia, lack of intellectual values, ingrained reluctance to take decisions, tendency to evade responsibility, and lack of individuality that they find in the Indian intellectuals.

D. S. Chauhan (1963), in a small empirical study conducted by him among college students in Agra, has found the Indian educated youth enmashed in the complex situation of flux caused by multiple socio-economic changes in the country.

Uma Shahani (1966) has presented a brief yet penetrating analysis of the attitudes and values of students in Indian colleges and universities. According to her :

> "The bankruptcy of intellectual life and integrity is there for all to see. What makes it sadder is that we do not *expect* anything better. Is it not a fact that most of our *soi-disant*, self-styled intellectuals are 'Westernized ?' Is there nothing in Indian life to serve and sustain them ? Or, is an intellectual a contradiction in terms ? Be that as it may, our bright young things continue to chew the cud of dead knowledge....with such a crowd, of the unwilling and the unfit, in the class the teacher does not know what to do and could not care less."

On the other hand, she finds the younger generation to be :

> "basically decent, as much hero-worshipping as ever before. Only today they have no heroes to worship, neither among the so-called "leaders" nor among the leaders of thought. That is where the shoe pinches" (Shahani, 1966)

An empirical study in the sociology of college administration based on the questionnaire responses of 216 undergraduates of the final year classes in the Faculties of Art, Science and Commerce, and the responses of 58 teachers of the Raj Rishi College, Alwar, Rajasthan, by Ruhela (1966), highlighted the low level of intellectual values in the students.

V V. John (1966) has underlined the disobedience and rebelliousness of Indian youth. He has, however, failed to present a balanced and comprehensive assessment of the values of the students and to trace the reasons of the growing phenomenon of indiscipline among them.

In an effort to analyse the causes of student unrest in the country, Yogendra Singh (1966) has written : "It is true that most of the students in India neither appear to be engrossed in self-search nor in critical appraisal of values in the same sense as students might do in some other countries. Nevertheless, even students in our country are critically aware of the happenings in their surrounding milieu." He has attributed the unrest in college students to the social malaise prevailing in the contemporary Indian society. According to him, "a vulgar form of pragmatic ethic seems to permeate our systems of values in daily life. Opportunism and short-sightedness are natural consequences of such a scale of values".

Rahul Singh (1966) has noted that the educated youth in India suffer most from "ideological vacuum" in the psychologically painful period of transition. Chandra Lekha Mehta (1966) has focussed on the sense of insecurity in the Indian educated youth due to shifting values and conditions. S. Radhakrishnan (1966) has underlined the absence of a clear perception of the values and culture of the country in the students.

The socio-cultural background and values of the Hindu adolescent girls of the Sadhna School of Educational Research and Training, Bombay, were studied by Shukla (1966) This small investigation informs us about some of the changing values of the respondents.

Bhatt and Advani (1966) have studied the social behaviour of 200 students of Class X in a school of Gujarat in eight areas: norms relating to adolescents' behaviour towards parents, norms relating to adolescents' behaviour towards teachers, moral values, social values, civic values, religion, education and boy-girl relationship. Four conclusions of the study are available: (i) on the whole, girls have more favourable attitudes than boys; (ii) deviant boys have less favourable attitudes than normal boys in all the areas studied; (iii) boys have most favourable attitudes towards parents and teachers and least favourable towards boy-girl relationships and religion; and (iv) deviant boys have most favourable attitudes towards teachers and parents and least favourable toward social and civil values. Despite the overlapping of some of the areas of social behaviour which have been studied, the results of the study have added to our knowledge of the attitudes and values of high school students

A very interesting empirical investigation has been conducted by Damle (1966). The major focus of this depth study was the analysis of the behaviour of the development of twenty-six academically as well as intellectually gifted college students of Poona in terms of the processes of socialization and individuation. The investigator has used a number of sociological as well as psychological research tools and the concepts of identity formation, competence and effective feeling in this study.

Bani Mahadev (1967) interviewed 600 fourth year students in Jamshedpur, Cuttack, and Banaras between August and November 1966, and concluded that real communication between their parents and them was lacking. A large majority of the respondents (80 to 90 per cent), irrespective of their personal qualities, family background and academic performance, agreed that "injustice prevails more than justice these days", and about half the respondents

(50 to 60 per cent) believe that it does not pay to be honest, sincere and hard-working. An interesting finding of the study is that a majority of students (397 out of 600, or 66 per cent) have denied the existence of any gap between their thinking and that of their parents.

Desai (1967) studied the social background and the changing values and aspirations of 540 high school students in the Baroda District of Gujarat State. The study revealed that whereas the students' inclination for further studies is the highest in percentage in case of the city students (85·60 per cent), the urban students (77·34 per cent) come next, followed by the rural students with the minimum percentage (62·15 per cent). The students planning for service is higher (32·14 per cent) in case of rural students than in the case of the urban (18·66 per cent) and the city (10·80 per cent) students. The number of students of the upper castes who have expressed a choice for further studies is almost twice (between 71·14 and 87·90 per cent), that of the students of lower castes (36·63 per cent). A majority of students (52·75 per cent) like their parents' occupations but would not choose these for themselves. The percentage of students who like their guardian's occupation and would also like to choose it is only 26·65 per cent. A majority of students (43·38 per cent) prefer to settle in a city and 30·56 per cent in a village, whereas 18·89 per cent have shown their preference for both city and village. These and some other findings throw some interesting light on the values of our high school students. However, the study seems to be a very narrow or limited one, as it has not tried to discover the attitudes and values of students on a number of important points. It is too much to conclude only on the basis of the choice of future occupation and choice of setting in a city or village whether the social aspirations of students are changing or not. This study presents a very parochial view of the personality and value structure of the high school students.

Gore and others (1967) have presented valuable data, collected through questionnaires, on the social background and values of students of high schools, colleges and professional colleges, based on field studies in the sociology of education in eight States, namely, Andhra Pradesh, West Bengal, Gujarat, Maharashtra, Mysore, Orissa, Punjab and Rajasthan. As many as 5,346 high school students (2,960 males and 2,386 females), 3,734 college students (2,028 males and 1,706 females), and 2,551 students of professional colleges (2,291 males and 260 females), *i.e.*, a total number of 11,631 students were studied. So far as values are concerned, students' responses on five important value items have been taken. These are: secularism, activistic approach to life, optimism, achievement orientation and acceptance of citizenship responsibility. The findings of the study are very revealing. The percentage of secular response is generally high in each category of the students but it is the highest ni the case of the professional college students, the range being between 60 per cent and 84 per cent. Similarly, among the professional college students, there is a higher percentage of caste rejectors than among other students. The college boys have also a higher percentage of caste rejectors than the high school boys in a majority of States. Most of the students in each category think that the changes around them are for the better. More males than females consider themselves in the position of being able to influence the changes taking place around them. A lesser percentage of girls than boys at the high school stage, but a greater percentage of girls than the boys at the college stage, consider that they have bright chances of achieving the goals they have set for themselves. College students have a somewhat higher proportion of 'hopefuls' rather than the schools have, and males have more 'hopefuls' than females have in so far as the belief that improvement in one's social status is easy to achieve is concerned. An overwhelming majority of students (65–90 per cent in all the States and at all levels) chose a 'this-worldly' or materialistic orientation in life. In five States boys at the high school level choose it more often than the girls (the difference being not more than 50 per cent) whereas at the college level girls seem to choose it much more than the boys. Among the professional college boys, again, the percentages are higher in six States than they are among students either in high schools or in colleges. Boys have been found to be more modern than girls, and among boys the professional and college boys are more modern than high school boys, showing that education is an important variant. West Bengal students rank first on modernity while students from Maharashtra, Andhra and Gujarat rank low. All these findings, along with others relating to the social background and study habits of students, add significantly to our knowledge of the attitudes and values of our students. In view of its large coverage and methodological sophistication, this study has been a very significant one. But even so, as one goes in to the details of the full report, one feels that the treatment given to the study of values in this study has been rather limited to yield anything sufficiently definite about the modernity of our students.

B. N. Ganguli (1968) has dealt with the problem of the alienation of the intellectual, "a phenomenon which is explained by the lack of adjustment between the life of the mind and the life of the community" since colleges and universities in India have become 'islands in a sea of ignorance and obscurantism".

As is clear from the above review of studies in the sociology of the values of Indian students, a number of research methods have been used in them. While the case-study method, projective techniques and other phychological methods and tools have been used in only two studies, questionnaires or self-administered schedules, observation and documentation or study methods have been used in most of them, probably because they are less expensive and less time-consuming than the former methods. Even where interviews could have been possible, it seems that the researchers have preferred to administer schedules or questionnaires rather than to interview students individually or in groups. This might have been done to save the adolescents under study from the embarrassment caused to them by asking them to give verbal responses to delicate questions relating to their values. In all these studies, the trends in attitudes and values of the student-respondents have been expressed by simple statistical treatment of data in the form of percentages. Often doubts are expressed by scholars from other disciplines about this sort of statistical treatment of values, since values are intangible, slippery and qualitative things and unless very large samples are studied, no clear-cut and reliable trends can be established. This may be true to an extent, but the fact is that quantification and statistical treatment of data, though it may not be very sophisticated, certainly has an edge over a mere descriptive presentation of qualitative data.

One very important shortcoming of all these studies seems to have been that in each of them the selection of value items, on which the responses *of* the students and *for* the students were sought by an individual researcher, was arbitrary. Apparently, in no study so far has any effort been made to first evolve an ideal construct or type or a comprehensive picture of either the traditional value-structure or the modern value-structure of the Indian society, and then to assess the value orientation of students against that background. That would have required interdisciplinary research in sociology, social anthropology, philosophy, history, indology and law. During the last ten years or so, the need for conducting such studies of fundamental value has been emphasized in India by leading sociologists like Louis Dumont, R. N. Saksena, M. N. Srinivas, Kewal Motwani, and others but still no such studies have been undertaken.

THE STUDY

The purpose of this investigation was to study as to which of the traditional values of the Indian society have become ineffective and which ones still have a hold on the beliefs and behaviour of college students in Delhi.

Library research

Before the investigation proper was commenced, a considerable amount of library research in the traditional values of the Indian society was undertaken. It was found that in spite of the existence of innumerable writings on the traditional culture of the Indian society, no commonly accepted portrait of it has so far emerged.

It was therefore decided to make a comprehensive study of the related writings of sociologists, social anthropologists, philosophers, historians, indologists and political thinkers.[1] This included the works of sociologists like R. K. Mukerjee, G. S. Ghurye, M. N. Srinivas, R. N. Saksena, Edward Shills and others; social anthropologists like McKim Marriott, P. N. Prabhu and others; philosophers like S. Radhakrishnan, Albert Schweitzer, S. C. Chatterjee, D. M. Dutta, and others; historians like A. L. Bhasham, Sisir Kumar Mitra, K. A. Nilkantha Shastri, Radhakumud Mukerji and others; journalists and others like Koestler, V. S. Narvane, Nirad Chaudhuri, Taya Zinkin, Ronald Segal, and others; educationists like K. G. Saiyidain and A. B. Shah, and political scientists like G. S. Halappa, Vera Micheles Dean, A. H. Somjee, and Myron Weiner Some primary sources of Indian religions were also tapped.

This study enabled the present researcher to locate the salient traditional values upheld by the different religions, sects and cultural movements in India. Value statements, one for each value, of the values thus studied were prepared.

The instrument

The value statements thus formed were classified into the following eight categories according to the typology of values suggested by W. M. Urban (1947):

1. Organic Values
2. Economic Values
3. Recreational Values
4. Associational Values
5. Character Values
6. Intellectual Values
7. Aesthetic Values
8. Religious Values

Thus a tentative list of 123 value items was prepared. A panel of ten social scientists was requested to suggest omissions or additions to the list or a revision of the wording of any of the value statements included therein. Five members in the panel responded to the request. On the basis of the responses received from them, a check-list of 131 values of the traditional Indian society was finalized.

The check-list was kept open-ended so that the students, to whom it was to be administered, could make further additions to it if they so liked. No caption or heading to denote a particular type or set of values was given in the final list, and a running number was assigned to all the 131 value statements. Two columns were drawn facing the value items:

A. Belief: This was divided into three sub-columns: 'Yes', 'No' and 'Uncertain'.

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[1] Sources listed in the bibliography and references.

B. *Practice*: This was divided into two sub-columns: 'Practising in my life' and 'Not practising in my life'.

Instructions to the respondents for recording their reactions to the value statements were given at the top of the check-list. They were allowed to give their detailed reactions in the blank space at the back of the list. The basic data demanded from each respondent was about his or her academic class, college, family occupation, age, sex, religion and caste or sect. The respondent was given the option of revealing his or her name, or otherwise.

The sample

The subjects comprised a random sample of 100 students (59 boys and 41 girls), undergraduate to post-graduate, drawn from the various arts, science and commerce colleges and professional institutions of Delhi. The sample was kept deliberately small as the present investigation was designed only as a pilot study.

Background of the respondents

The background of the students included in the sample is indicated in the following tables:

TABLE 1

Faculty-wise distribution of the respondents

FACULTY	BOYS	GIRLS	TOTAL
Arts	8	18	26
Science	..	17	17
Commerce	10	..	10
Law	6	..	6
Engineering	23	..	23
Education	7	5	12
Medicine	5	1	6
Total	59	41	100

TABLE 2

Academic levels of the respondents

FACULTY	UNDER GRADUATE LEVEL	POST GRADUATE LEVEL	DOCTORAL LEVEL	TOTAL
Arts	14	9	3	26
Science	17	..	..	17
Commerce	10	..	..	10
Law	6	..	..	6
Engineering	23	..	..	23
Education	..	11	1	12
Medicine	..	6	..	6
Total	70	26	4	100

TABLE 3

Age-groups of the students constituting the sample

FACULTY	SEX	BELOW 20	21–25	26–30	31–35	ABOVE 35	TOTAL
Arts	Male	..	4	3	..	1	8
	Female	14	4	..	..	..	18
Science	Female	17	..	..	..	..	17
Commerce	Male	8	2	..	..	..	10
Law	Male	..	4	1	..	1	6
Engineering	Male	11	12	..	..	..	23
Education	Male	..	..	3	2	2	7
	Female	..	1	3	1	..	5
Medicine	Male	..	..	5	..	..	5
	Female	..	1	..	..	..	1
Total	Male	19	22	12	2	4	59
	Female	31	6	3	1	..	41
Grand Total	..	50	28	15	3	4	100

TABLE 4

Family occupations of the informants

FACULTY	SEX	SERVICE	BUSINESS	AGRICULTURE	OTHER	NOT MENTIONED	TOTAL
Arts	Boys	4	1	1	1	2	9
	Girls	9	6	..	1	2	18
Science	Girls	8	2	..	..	6	16
Commerce	Boys	..	10	..	..	..	10
Law	Boys	2	..	1	..	3	6
Engineering	Boys	11	4	3	..	5	23
Education	Boys	2	3	2	..	..	7
	Girls	3	1	..	..	1	5
Medicine	Boys	2	3	..	..	..	5
	Girls	1	..	..	..	..	1
Total	Boys	21	21	7	1	10	60
	Girls	21	9	..	1	9	40
Grand Total		42	30	7	2	19	100

This table clearly shows that a majority of our respondents have emerged from the middle class.

TABLE 5

Religious affiliations of the respondents

HINDUS	MUSLIMS	SIKHS	CHRISTIANS	JAINS	OTHERS	TOTAL
79	1	13	..	7	..	100

FINDINGS

Students' relations to traditional values

Organic values: Seventeen value statements relating to the needs of the body like eating, sex, good health, etc., and the related institutional behaviour were presented. A majority of the respondents, both boys and girls, have revealed that they are believing in as well practising the following values in their own lives:

One should eat to live and not live to eat.
One should eat meat.
One should not eat beef.
Sex should be enjoyed with one's married partner only.
One should remain a bachelor till his studies are over.
One should have only one husband or one wife at a time.
One should be free to marry any person of his/her choice.
The first duty of a person is to keep himself healthy.

Some interesting changes are noticeable in the respondents' reactions to some of the values, as discussed under.

Whereas 51 per cent boys do not believe in the desirability of controlling hunger by fasts and 63 per cent boys actually do not observe fasts, a majority of girls (53 per cent) certainly believe in observing them; like most of the boys, however, they are not actually observing them in their own life.

In response to a value statement that one should marry a person selected by his or her parents, a majority of boys (51·8 per cent) have replied in the negative, although 30 per cent of them have submitted that in actual practice either they have already bowed down before the wishes of their parents or will have to do so in the future. The girls revealed a cognitive dissonance on this value; 15 out of 41 (*i.e.,* 37 per cent) girls ticked in favour of the value statement whereas 14 girls (*i.e.,* 34 per cent) replied in the negative; 22 per cent girls, however, could not decide anything about it. As many as 12 (or 29 per cent) of the girls have stated that they would have to yield before their parents when the question of their marriage would arise but 36 per cent of the girls have stated that they would not bear parental interference in this matter.

Values relating to hypergamy and hypogamy have been rejected by a majority of the respondents—both boys and girls.

An interesting value-conflict has been discovered in regard to the value that one should marry within his/her own caste only. A majority of boys (36 out of 59, *i.e.,* 61 per cent) as well as that of the girls (21 out of 41, *i.e.,* approximately 50 per cent) have stated that they no longer believed in this value. A majority of boys (approximately 36 per cent) were quite firm that they would not let it happen in their cases, but the girls were again caught up in a value-tension. While 11 girls have agreed that they would, in all probability, marry within their own castes whether they liked it or not, 12 girls have disclosed their firm intention to break away with tradition and go in for inter-caste, inter-religion or inter-community marriages. The fact that 43 per cent of the female respondents have not given any response possibly indicates that a good number of them also wish to rebel against the tradition in their own lives, but due to their modesty, they have chosen silence here.

An overwhelming majority of boys (69 per cent) and girls (51 per cent) believe that sexual enjoyment is a dirty thing after all, as most ancient Hindu philosophers held. However, as many as 45 per cent boys (27 out of 59) and 19·5 per cent girls (8 out of 41) admitted that they have already experienced sex. As many as 20 girls (48 per cent) have chosen to be silent on sex experience in their lives.

Economic values: A majority of male as well as female respondents have expressed their belief in, and their practice of or their desire to practise, the following economic values:

One should earn as much wealth as possible in his married life.
One should accumulate wealth for his children.
One should save for his future.
One should not run after wealth all the time.
One should be honest in his profession.

However, in the case of some other economic values there are significant divergences in the views of the respondents. A vast majority of boys and girls neither believe in, nor like to follow in their own lives, their family occupations. Similarly, most of the respondents belonging to both the sexes, do not consider it proper to make excessive profit in their business or occupation anyhow. A majority of girls would not enter business themselves but they will certainly exert their opposing influence in regard to this value if they happened to be the wives of businessmen. The boys appear to be almost equally divided on this issue.

An overwhelming majority of both boys (81 per cent) as well as girls (83 per cent) have disagreed with the value statement that a wife must carry dowry with her to her husband's house. However, strangely enough, a majority of boys (20 out of 59, about 34 per cent) could not hide their wish to receive dowry as it meant a significant economic gain to them. The girls were almost equally divided on the issue. Whereas 13 (32 per cent) girls would not like to oblige dowry-seekers, about 29 per cent of them are quite realistic in their approach as in view of the great force of the prevailing custom they have felt that, whether they liked it or not, they would have to carry a dowry with them if at all they wished to be married.

Recreational values: While there is a great deal of agreement in the respondents' belief and practice as regards playing games as a means of recreation, significant differences are noticeable in their reactions to issues like gambling and hunting as means of amusement. A majority of boys (31 out of 59, *i.e.*, 53 per cent) do not consider gambling to be a worthwhile means of amusement but they are equally divided as regards practising it, being unable to say whether or not they would actually adopt it in their lives. Strangely enough, an equal number of girls, *i.e.*, 21 in each case, believe as well as disbelieve in the desirability of indulging in gambling as a means of amusement, and a majority of them (23 out of 41, *i.e.*, 56 per cent) actually practised it. This alarming degree of permissiveness towards gambling as a means of amusement on the part of the college girls included in our sample may be due to the facts that have mostly had a middle-class family background and abundant opportunities of mixing with boys freely in hostels, clubs and hotels. Hunting as a form of amusement is acceptable in principle to a majority of boys as well as girls, but obviously a majority of girls actually do not foresee any possibility of practising it in their own lives—possibly because it is an outdoor activity which is considered to be unwomanly in our society.

Associational values: A majority of the respondents belonging to both the sexes believe in and practise, or at least try to practise, these associational values: having kinship feelings for the people of one's sect or *panth*, observing equality amongst themselves, having many friends, contributing towards one's joint family, leading a peaceful life in one's society, serving others, helping poor people, educating one's children properly, being hospitable towards one's guests, being sympathetic towards others in difficulty, cooperating with others in desirable social activities and believing in the unity of mankind.

However, in the case of as many as thirteen values significant social changes are discernible. It is to be noticed that whereas a vast majority of boys and girls (78 per cent and 90 per cent respectively) have expressed their disbelief in one's having social relations mostly with persons of his or her own caste, strangely enough a majority of both sexes (50 per cent) in case of boys and 53 per cent in case of the girls) have not hesitated to tell the bitter truth that most of their social relations are in fact with persons of their own caste.

While boys seem to be equally divided on whether it is one's duty to favour those of his own caste or sect, and a majority of them have stated they are doing that, as many as 75 per cent of the girls have strongly repudiated this idea. In actual practice, however, the girls are equally divided among themselves on this particular value.

A majority of the boys as well as girls mostly have relations with their own kin, although on rational grounds they often question the desirability of having such a narrow value.

As many as 56 per cent boys (33 out of 59) and 83 per cent girls (34 out of 41) no more consider it proper to obey one's parents and teachers 'uncritically', but the paradoxical situation is that a majority of boys as well as the girls (52 per cent and 66 per cent respectively) do not actually question the wishes, dictates or doings of their parents, teachers and elders—although they might frequently resent it at heart.

An overwhelming majority of boys as well as girls disapprove of the value statement that one should not have social relations with untouchables as their levels of intelligence and character may be lower than that of 'clean caste' persons.

As many as 61 per cent boys and 63 per cent girls do not believe it to be proper that a husband should have full control over his family 'like a king'. They seem to be inspired by the new concept of the husband's role—that of his being a democratic leader of the members of the family instead of being a despotic or autocratic ruler.

Most of the boys as well as girls neither believe in the supremacy of the Brahmins nor worship or respect them in actual practice now.

A little more than half the girls feel that we should even now have something like the ancient *ashram* system of the Hindus. A majority of the boys (45 per cent) however do not feel like that, but it should be pointed out that 41 per cent boys do actually believe in the desirability of having such a system.

An overwhelming majority of the boys as well as girls do not lend their support to, or go by, the traditional Hindu notion about the untrustworthy nature or inferiority of women in comparison to men.

Character values: A majority of the male as well as female respondents have reported their belief and practice in the following traditional values relating to good character:

Action is one's duty and reward is not his concern.
One should be good to everyone—even to his enemies.
One should be thoroughly honest under all circumstances.
One should be industrious in his work.
One should be loyal to all others.
One should serve his old parents.
One should not hesitate to sacrifice his wealth for the welfare of his younger brothers and sisters.
One should have pity for others in trouble,

One should have high ideals and aspirations in his life.
One should do the work allotted to him honestly.
It is good to have high ideals but one should not hesitate to abandon them and act differently if the circumstances so warrant.

In spite of this astounding conformity to the traditional values, a majority of our respondents (67 per cent boys and 78 per cent girls) have rebelled against the traditional Hindu conception of a loyal wife—that she should silently bear all sorts of atrocities or vices of her husband. They think that it is a perfectly outmoded and undesirable concept and so it should have no place in our society now.

Intellectual values: Most of the intellectual values nourished by Indian traditions have found favour with a majority of our respondents. They have informed us about their belief in as well as practice of values like the desirability of having a good teacher, having absolute faith in one's teachers, having curiosity regarding all new things, considering one's life useless without acquiring knowledge, having uninhibited discussions with others, not believing in unseen things, being reverent and humble towards teachers and elders, and considering only that knowledge to be really worthy which enables one to achieve self-realization and one's rightful place in the society.

The notable exceptions, however, are as regards having absolute faith in the written word and in cramming as a method of learning. Most of the boys and girls do not believe in them but they do very often come under its influence.

Although a majority of the boys as well as girls have stated that they believe in the proposition that real knowledge is that only which enables a man to earn his living, yet they have admitted that in behavioural terms they may have to act contrary to their belief.

A majority of the boys as well as girls neither think that real knowledge must by nature be unworldly, nor are they trying to acquire this type of knowledge.

Aesthetic values: In belief as well as in practice, a majority of the boys as well as girls accept the traditionally acclaimed aesthetic values of the Indian society, such as: beauty is to be admired and enjoyed; one who does not love others is not a good person; one should not hesitate to sacrifice anything for fulfilling his/her beloved's desire; one must have affection for all those younger to oneself.

There is, however, an interesting divergence of belief on the part of both the sexes on the value that 'for a beautiful thing one should not hesitate to sacrifice anything'. Whereas a majority of the girls (39 per cent) are inspired by this ideal, a majority of the boys do not believe it to be a desirable value. However, they have admitted that in their actual behaviour they cannot help falling prey to the irresistible temptation of anything beautiful.

Religious values: A number of value statements relating to different religions in India and the elements of morality preached by them through the centuries of India's history have irritated most of the young collegiates included in the sample. A majority of both boys and girls have registered their disbelief in, and non-practice of, the following values:

Non-believers in the prophet of one's religion should be killed.
Heathens and barbarians should be converted to Christianity.
Idol-worship is the best kind of worship.
It is one's foremost duty to try to propagate his religion.
One should care more for improving his life after death rather than for this worldly life.
This worldly life is worthless after all.
One must eat, dress and behave strictly according to what is traditionally prescribed in his religion, sect or *panth*. (A majority of the girls, however, are habituated to behave as such.)
Miracles do happen at the command of the gods, or saints and other holy persons.
Ghosts and evil spirits do exist.
If one's food is touched by a lower caste person it becomes polluted.

A majority of male as well as female respondents have revealed their belief and practice in the case of the following values:

One should have attitude of faith in and help towards hermits and saints.
Every soul passes through an endless cycle of births and rebirths.
One should not believe in idol worship.
One should give in charity to the needy.
One should feed animals and birds.
All that is written in one's religious books is good for one even today.
There is only one God.
God certainly exists.
Non-violence must be practised by every one.
One should believe in nature if he is a religious man
One should pray to God every day.
All religions must be respected.
One must work for the salvation of his soul,

The mother must be respected above all.
Eat, drink and be merry, for tomorrow we die.
A man should be prepared to sacrifice everything for the sake of spiritual attainments.

That the womenfolk in India are still more religious-minded than the menfolk is amply borne out by the following differences in the beliefs and practices of our respondents in respect of some of the value items. Thus, for example, a majority of girls have revealed their belief and practice in the following values which the majority of boys have not favoured:

One should worship the cow.
Those who do not do good actions in their worldly life do not gain after death.
Whenever there is a great threat to religion, a incarnation of God is born into this world.

A very strange fact is suggested by our data on the value concerning good and bad omens. While 34 per cent boys believe in them and 42 per cent actually act according to them, the female believers and practitioners are only 9 per cent and 34 per cent respectively. This challenges the prevailing notion that Indian women are more superstitious than Indian men.

Similarly, while a majority of both the sexes do not believe in the usefulness of observing religious rituals relating to the death of their relatives, they have stated that they would have to yield before the force of custom held so steadfastly by their elder kinsfolk.

Although a majority of the respondents themselves do not eat meat, yet they have categorically disbelieved in the value that 'a person professing non-violence must not eat meat'. A majority of the boys and girls do not find any rational meaning in observing religious fasts, and a majority of the boys actually do not observe them, yet a majority of girls, well over 58 per cent, do observe them.

While a majority of the boys as well as girls consider it to be improper to give charity to religious people and hermits and a majority of the girls never do so, it has been stated by a majority of the boys that they do give charity very often—much against their belief. Although they do not kill animals, it is not considered to be a sin by a majority of the respondents.

LIMITATIONS OF THE STUDY

This study has had two limitations. Firstly, it is based on a very small random sample of 100 students only. That is so because, as explained earlier, it was intended to be only a pilot study. Had it been conducted on a bigger national sample, the trends would have been still more clearly discernible. Secondly, it was not designed to discover the causes or factors responsible for the reactions given by the respondents.

CONCLUSIONS

The above analysis of the data of our study indicates three over-all significant trends or conclusions, as discussed below:

1. In regard to several values, there are significant differences in beliefs and practices between the boys and girls.

2. Although it appears that most of the respondents are quite aware of the new or modern values and they seem to realize as to which ones among the traditional values are now getting out of date and are worth discarding, yet in actual practice they are still under the powerful hold of the traditional values of the Indian society. They seem to accept apologetically and helplessly their defeat or submission before the traditional values. They suffer from cognitive dissonances on many scores, but instead of being able to resolve or overcome them quickly by taking desirable decisions, we find that the indecision on the part of Indian collegiates grows and grows till it renders them almost incapable of standing up to their own enlightened rationale or new convictions with boldness and courage. For support, they again fall back on their traditional values. Thus, despite a good deal of modern education received by them and the much-talked-about influences of Westernization, we find that basically Indian collegiates are, more or less, as traditional as ever; their progress in the direction of achieving and practising modern values can certainly be rated as being much below expectations.

3. The college students may, however, be given credit for one thing. There reactions have shown that they do not disregard some traditional values which are the *summum bonum* of the Indian culture. In doing so, though their behaviour is out of tune with the times in several respects, their great insistence on the core values of the culture offers a challenge to those scholars in sociology, education and other social sciences who have propagated accounts of Indian youth caught up in a devastating situation of anomie or having become perfect turncoats as a result of the conflicting pulls of tradition and modernity in India. Indian youth must certainly be given credit to the extent to which they still believe in and practise the worthwhile content of the traditional values, for, after all, not all of these values are useless today.

If the social and cultural trends in the beliefs and behaviour of the collegiates as suggested by this pilot study happen to be corroborated by an extensive national study, then they would pose one very serious question before the social scientists and educationists of this country: How can the morale of youth be boosted up so that they may learn to stand up to their new and progressive beliefs or enlightened convictions gifted them by their modern education and enlightened ideals of democracy, secularism and social welfare to which the Indian nation has committed itself? It should be of a great concern to the educationists that our students in institutions of higher education continue to show such symptoms of an avowed tendency of conformity and the instinct of escapism in the conflicting and challenging situations emerging out of the multi-dimensional social changes in the country.

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Innovation in Education

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The author interprets the nature of change and the change process in education, and draws attention to the exclusive features and problems of educational innovation. In this context, he summarizes and reviews the main findings of significant innovation-diffusion studies conducted during recent years.

Change in education tends to be planned, rather than spontaneous. Planned change would attempt to meet various educational needs, and these may be individual, local, state, national or international. Many efforts have been made to bring about change in the field of education from time to time, but the emphasis in these efforts has tended to be on the contents of the desired change, rather than on the nature of change or on the consequences of change process. The study of the change process in the field of education is of great value in planning and guiding the course of educational change intelligently. We need to know for example, why a particular innovation spreads slowly or rapidly, what the causes of resistance to change are in educational systems and how to induce teachers to accept change so that they may adopt innovations in the classroom.

Beginning with the sources of potential change in education, Ross (1958) identified three general external forces for change in this field:

1. Changes in the social setting or environment in which the system functions.
2. "The growing body of knowledge" in most fields.
3. "The growing body of educational innovations."

In various ways, change in education has been and still is considered as being:

1. *Evolutionary.* The school is a conservative social institution, and change must develop naturally and slowly so as to 'conserve' the values and purposes for which it was designed.
2. *Voluntary.* The school is a creation of a democratic society and change must be the choice of the community.

3 *Selective.* The school should not change in all its aspects. Solutions will be determined as needs arise.
4. *Economic.* In a democracy, the schools are run by the tax paid by the people. Change must either produce tax benefits or be within the limits of the public willingness to pay.

Definition of terms

At this stage it may be useful to define certain terms which are used in this paper.

There are many definitions of education, but the one which seems to be of greatest utility in our present circumstances is the following:

Education may be defined as planned change over a period of time in the behaviour of the student.

This definition is particularly useful in that it focuses attention on the student (it is *his* behaviour we are studying) and suggests that the process is *planned.*

Change is an undefined primitive term. It generally implies that, between two points in a period of time, some noticeable alteration has taken place in something.

An *innovation* is an idea perceived as new by the individual. It may be defined as a deliberate, novel, specific change which is thought to be more efficacious in accomplishing the goals of a system. Innovation is a species of the genus 'change'. *Adaptability,* a synonym for innovativeness, may be defined as "the capacity of a school to take on new practices and discard outmoded ones" (Rogers, 1965).

Diffusion is the process by which an innovation spreads. *The diffusion process* is the spread of a new idea from its source of invention or creation to its ultimate users or adopters. The essence of the diffusion process is the human interaction in which one person communicates a new idea to another person.

Adoption is a decision to continue the full use of an innovation. The *adoption process* is the mental process through which an individual passes from first hearing of an innovation to its final adoption. A major difference between the diffusion process and the adoption process therefore is that while diffusion is interaction *among* persons, adoption is a process occurring *within* the individual.

The term *adoption process,* which is proposed and used by the rural sociologists, can be traced to the learning theories of psychologists (Rogers, 1965). Learning is defined by psychologists as a relatively enduring change in the response to stimulus. The heart of most learning theories is the stimulus-response relationship. A stimulus is interpreted and causes a response in the individual.

Continued reinforcement of this response by later stimuli results in a more or less permanent change in the individual's behaviour—this is, learning.

The process by which innovations are adopted by individuals is essentially a limited example of how any type of learning takes place. In the adoption process, various stimuli about the innovation reach the individual from the communication process. Each ensuing communication about the innovation cumulates until the individual responds to these communications, and eventually adopts or rejects the innovation.

The study of change as a concept in education

Although 'change' is not a new concept to education, the ways of thinking about it have varied with the times. It is the purpose of this paper to review some of the ways in which education is beginning to study change and some of the implications of the experience of change in other fields for educational change.

As Eboch (1966) points out, educationists agree that there is no comprehensive theory of educational change. If the concept of planned change is to bring some order out of the chaos existing in today's schools, there must be a search for a theory of educational change. Here it may be said that education need not be apologetic about using concepts from other fields; all disciplines use ideas and methods from other disciplines and each discipline grows through this interdisciplinary approach. The task of educators seeking to promote planned change is therefore to build a theory using relevant concepts which have been discovered in other disciplines and to apply it systematically to educational practice. We may, therefore, now consider some of the implications of other disciplines for educational change.

Regarding anthropology, Williams (1966) states that change and persistence are reciprocal universal attributes of culture and that any study of change must take into account these cultural attributes, as well as the human characteristics of reflection and ego defence. Accordingly, the problem of change in education can be viewed only in the context of the culture in which that education exists. Since man can now predict more precisely economic and technological events for the next 20 to 30 years, Williams suggests that we refocus the educational process to the future, and away from the past.

Hobbs (1956) reinforces the change-persistence reciprocals from the research tradition of rural sociology when he states that social change is normal and deviant at the same time. He identifies five stages of social change: development, diffusion, legitimation, adoption and adaptation. According to Hobbs, the principal forces for change in education are external to the educational system, as the internal forces are oriented toward maintaining stability. Consequently, eduactors primarily react to change-inducing forces instead of using these forces to bring about change.

Jung and Lippit (1966) plead for the utilization of scientific knowledge for planned change. The structure of the school system is a coordination of educational process at five levels of human phenomena: the pupil as a functioning, unique self; the classroom peer-group; direct workers with the pupils (the teacher, counsellor, etc.); those who directly facilitate or inhibit the efforts of the direct workers; and persons who influence the policy and structure of the school system as a total community organization. To improve education, they say, we must:

1. diagnose the priority needs for change,
2. find existing innovations as alternatives for action toward change, and
3. locate sources available to work toward change.

They point out that research itself can seldom be used in the practical world; it must first be transformed into useful information. For example, the teacher concerned about how to get his pupils to be more active in class-participation is not likely to discover research findings which will tell him exactly what to do. To get help from research, he will need to derive implications from the findings that might help him to meet the classroom situation. Deriving implications from research is perhaps one of the most overlooked areas in education.

From the point of view of economic development, Sanders (1966) calls for a diagnosis or assessment of the present condition of educational services. He feels that it is unnecessary to combine various educational innovations under the single category of change, which he says needs to be more precisely conceptualized. We need to specify various classifications of change and to invent means for analysing and planning for the categories which are most meaningful and useful. This implies that priorities are related to needs must be lished.

The process of educational innovation

Educational change results largely from the efforts of innovators, whether they are individuals or school systems. This process by which innovations are adopted by individuals is an example of how any type of learning takes place. Based upon approximately 500 studies of diffusion, drawn mainly but not exclusively from the field of agricultural innovations, Rogers (1965) conceptualized five stages in the adoption process; awareness, interest, evaluation, trial and adoption At the *awarenses* stage, the individual is exposed to the innovation but lacks complete information about it. He then becomes interested in the innovation and seeks information about it at the *interest* stage. At the *evaluation* stage the individual mentally applies the innovation to his present and anticipated future situation, and then decides whether or not to try it. At the *trial* stage, the individual uses the innovation on a small scale in order to determine its utility in his own situation. At the *adoption* stage, the individual decides to continue the full use of the innovation. Evidence from research studies indicates that the conception of the stages of adoption is probably valid.

Perhaps the most comprehensive analytical framework describing the process of an educational innovation is found in the work of Clark and Guba (1965). They sorted out four major classes of activities in the innovation process—research, development, diffusion and adoption—which follow a model developed by rural sociologists. In adapting this model, they have defined the innovational activities in the educational setting.

The scheme evolved by Clark and Guba (1965) gives us the following series of linked definitions describing activities in the innovation process:

1. Research : To advance knowledge
2. Invention : To formulate a new selection to a problem, *i.e.,* to innovate
3. Design : To systematize the components of the invented solution, *i.e.,* to engineer
4. Dissemination : To create widespread awareness of the invention among practitioners, *i.e.,* to inform
5. Demonstration : To examine and assess the operating qualities of the invention, *i.e.,* to build connection
6. Trial : To provide a basis for assessing the suitability of the invention in a particular institution, *i.e.,* to test
7. Installation : To fit the characteristics of the invention to the characteristics of the adopting institution, *i.e.,* to operationalize
8. Institutionalization : To assimilate the invention as an integral and accepted component of the system, *i.e.,* to establish.

The agencies and persons participating in educational innovation include[1]:

1. Students,
2. Teachers,
3. Principals,
4. Parents,
5. Inspectors of schools,
6. Boards of education,
7. Coordinators of extension service departments
8. Educational research centres.

Clark and Guba (1965) illustrate the adoption of innovations with an example pertaining to the introduction of changes in the school curriculum. The model[2] described below represents the two viewpoints referring to the hierarchy of the administrative set-up prevailing in an educational institution.

Table 1 represents the 'administrative view' which places the expertise on curriculum innovation with the instructional leaders. This view does not allow power decisions to be made by the teachers or students. They are at the bottom of the power structure when it comes to the introduction of curriculum changes. The real decisions on curriculum changes are made by the board of education, the inspectorate, the curriculum specialist, etc. The teacher and student are not consulted in any way; they are only told that to do.

TABLE I

ADMINISTRATIVE VIEW

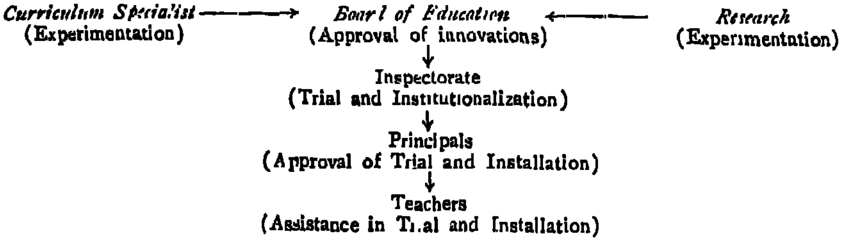
Curriculum Specialist
(Experimentation)
Board of Education
(Approval of innovations)
Research
(Experimentation)
Inspectorate
(Trial and Institutionalization)
Principals
(Approval of Trial and Installation)
Teachers
(Assistance in Trial and Installation)

Table 2 represents the 'classroom view' which assumes that knowledge and understanding of curriculum are possessed by teachers and students. The distribution of decision-making power is a reversal from that in the administrative view. The teacher and student are now at the top of the power structure, with their roles determining the curriculum innovations. Clark and Guba (1965) endorse the classroom view, though unfortunately, many teachers have not thought out any point of view as regards curriculum change. The viewpoint suggested is an organizational arrangement that would allow teachers and students the

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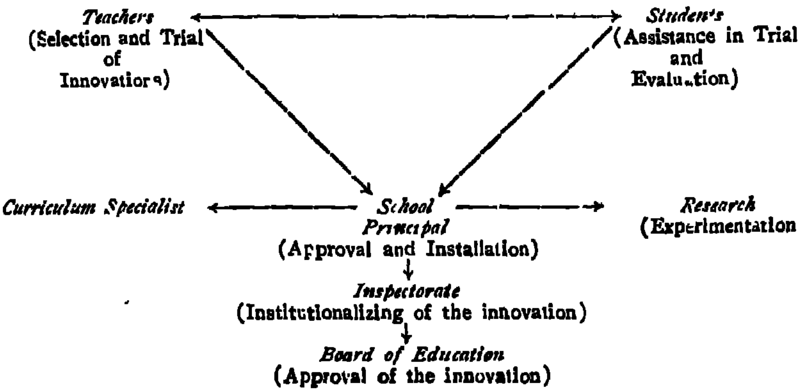
[1-2] Modified by the present author to suit Indian conditions,

opportunity to play a central role in making decisions about the curriculum. The importance of teacher participation in planning the educational development is now being recognized everywhere. Teacher involvement is the key to the effectiveness of educational innovations.

TABLE 2

CLASSROOM VIEW


Teachers
(Selection and Trial of Innovations)
Students
(Assistance in Trial and Evaluation)
Curriculum Specialist
School Principal
(Approval and Installation)
Research
(Experimentation)
Inspectorate
(Institutionalizing of the innovation)
Board of Education
(Approval of the innovation)

Apart from the model put forward by Clark and Guba (1965) for demonstrating the change process in education, there are a few other models, but these seem to be more specific and limited in focus. We need to have more models representing a comprehensive view of educational change.

Some studies on educational innovation

Mort and Cornell's (1941) study at Columbia University is generally credited as the most extensive work in education related to the change process.

Ross (1958) has reviewed in detail about 150 studies in educational diffusion.

Recently, Mathew Miles (1964) has edited a collection of papers by more than twenty authors representing many of the current points of view concerning educational change.

Of late, studies in educational diffusion have been taken up in the U.S.A. at the Universities of Michigan, Ohio, Kentucky, Oregon, and Southern California.

But in India there has been hardly any attempt so far to study the process of change in education. However, the Department of Extension Services of the National Council of Educational Research and Training has recently initiated a programme of collecting and disseminating some of the tested good practices prevailing in different schools.

Some findings of studies on educational diffusion

The majority of the studies on education diffusion have been done at the Teachers' College, Columbia University. Ross (1958) has reviewed these studies done at Columbia University in detail. The data were most often gathered by mailed questionnaire from school principals. The unit of analysis was the school system in almost all these investigations. The findings have been summarized as follows:

1. The education diffusion tradition runs through the largest number of studies, but this tradition is probably one of lesser significance in terms of its contributions to understanding of the diffusion of ideas. The education diffusion studies illustrate strong intercommunication within the tradition, but no close attention to any other diffusion tradition.

2. Among the great variety of factors related to innovativeness (or adaptability) among schools, the best single predictor of their dimension is educational cost per pupil.

3. A considerable 'time-lag' is required for the widespread adoption of new edcuational ideas. The average American school lags 25 years behind the best practice. The causes for the slow diffusion of educational innovations as compared to farm innovations or medical drugs are as under:

(i) The absence of a scientific source of innovations in education,
(ii) The lack of change agents to promote new educational ideas, and
(iii) The lack of an economic incentive to adopt the new ideas.

4. The pattern of adoption of an educational idea over a period of time approaches an S-shaped curve. At first only a few (pioneer) schools adopt the idea; then the majority think it desirable; and finally the adopter curve levels off as the last remaining schools adopt it.

5. The Innovativeness Scale developed by Mort and Pierce (1947), based upon a number of educational ideas, led to improved measurement of innovativeness by later researchers in other traditions.

The following observations have been made by other researchers:

1. The first nation-wide diffusion study of any kind was completed in the education tradition by Cocking (1951). He sampled 1,200 United States schools regarding their adoption of seven educational ideas such as student work experiences, career conferences, popularized budgets, and radio workshops. He found no significant differences among the regions of the United States as to their innovativeness in adopting these new ideas. More cosmopolite schools,

located nearer to metropolitan cities, were found to be more innovative (Rogers, 1965).

2. Eichholz postulated a theory of rejection of new ideas somewhat parallel to the adoption of innovations, based upon a study of the analysis of the rejection of such audio-visual innovations as films, filmstrips, radio programmes, and television shows for school purposes (Rogers, 1965).

3. Rogers and other researchers like Brickell and Bushnell suggest that school administrators could promote innovations within their schools if they sincerely accepted the role of change agents (Rogers, 1965).

4. In most of the diffusion studies the unit of adoption is an individual, but in the educational studies the unit of adoption is a school system (Rogers, 1965).

5. In general, the more flexible the system of interaction, within a system, the greater the opportunity for diffusion of innovations. But in a formally organized system like a school, informal communication among teachers is a less significant factor in diffusion of educational innovations (Mort and Cornell, 1941).

6. There are many barriers to change, as both Willower and Eichholz (1961) point out. Some of these are inherent in the organizational structure of our educational system, while others are the result of the negative attitudes of school personnel.

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An experimental study of teaching in single-teacher schools

The G. K. Institute of Rural Education, Garogoti, conducted this research study under the Grant-in-Aid Scheme of the National Council of Educational Research and Training, with D. V. Chickermane as the Principal Investigator.

The objective of this experimental work was to study the working of single-teacher schools and to evolve methods of work for these schools.

The following technique was adopted. An experimental single-teacher school was selected for implementing a specially drawn up programme, and some other schools, where the existing pattern of work was being followed, formed the control group. The programme lasted one full academic year. The work of the experimental school was periodically evaluated and, at the end of the year, a common evaluation test was given to both the experimental school and the control-group schools.

The programme of work given to the experimental school consisted of two parts: (i) the organization of work, and (ii) teaching methods.

The organization of work was further divided into:

(i) Seating arrangements, and grouping of pupils,
(ii) Plan of work and time-tables.

The teaching methods part was further divided thus:

a. Syllabus,
b. Activities,
c. Teaching procedures, equipment and teaching aids.

Organization of work

The students in the experimental school were divided into four classes and four houses. The classes were formed on the basis of the pupils' attainments. This was a horizontal distribution with an average age of 7, 8, 9 and 10 years respectively for Classes I, II, III and IV. This type of class distribution was used for instructional purposes.

The other type of grouping was the house system. In this grouping, a house consisted of pupils from all the classes. The first house consisted of three pupils from Class IV, three from Class III, and four pupils each from

Classes II and I. The other houses were also formed on the same lines. This kind of grouping was useful for activities. The children grouped themselves according to classes or houses as the circumstances demanded.

Seating arrangements in the experimental school were organized on both these bases. For classes, each class was allotted a corner in the room with a blackboard placed against the corner. The children sat round the blackboard in a semi-circle. Since the number of pupils in each class was small, they could sit close to the blackboard. In fair weather, the classes moved out under the shade of the trees. For houses, the children sat in a rectangular form, each house being seated along a wall. This left the place in the middle open for activities.

The instructional programme fell into three closely-knit divisions: activities, teaching, and assignments for self-study. The activities included those leading to health education, to knowledge of the physical and social environments, to love for art and music; and those intended to develop mastery over the tools of knowledge, such as reading, writing, etc. Teaching was generally restricted to the three R's, and general information. The self-study programme was worked simultaneously with the teaching programme. When one class was under instruction, the other three classes were busy in assignments.

The time-table for the experimental school provided for the three types of work, namely, activities, teaching and self-study. To avoid fatigue, the duration of a period was fixed at fifteen minutes. When a longer duration was required, for games or craft work, two or more periods were combined. The experimental school worked in two shifts: morning and afternoon. This provided for a long break of four-and-a-half hours, from 10-30 a.m. to 3-00 p.m. The time-table was flexible. The morning session was devoted to activities and the afternoon session was utilized for academic work, teaching and self-study.

A special feature of the time-table was the Saturday outing to visit and study the local post-office, village temple, market, etc., by turn. In addition to the routine time-table above, on holidays and Sundays, the children observed special cultural programmes and celebrations like national days and religious festivals in the locality. They also did gardening and clay work and produced manuscript magazines as activities in their spare time in addition to their activity on these in the school hours.

Teaching method

The curriculum of the experimental school was rural-centred with provision for a number of activities. The academic content of the curriculum was identical with that of the control-group schools. The teaching programme arose as far as possible from the activities. All the four classes were combined for social studies and general information.

Evaluation

The last part of the programme was the evaluation of the experiment. This was both *internal* and *external*. *Internal evaluation* was conducted by quarterly tests. These tests were cyclostyled and given to pupils. The tests were of the new type, requiring short answers. There was one continuous test for the whole group, so that children could attempt questions meant for higher classes as well. The quarterly tests were followed by an external evaluation test at the end of the year. This test consisted of 100 items, printed on sheets, and covering the three areas, namely, the mother-tongue, arithmetic and general information. This test was given both to children in the experimental school and in the control schools. The marks obtained at this test were studied to determine the impact of the new technique on the experimental school children.

Results

The results showed that the children in the experimental school had made greater progress than those in other schools, both single-teacher and multi-teacher, and that the technique under experiment was well suited for the improvement of single-teacher schools.

BOOK REVIEWS

Quantification in Behavioural Sciences

Handbook of Research Design and Social Measurement

Delbert C. Miller. David McKay Company, New York, 1964. (Second Printing, 1967.)

Sociological Measurement : An Inventory of Scales and Indices

Charles M. Bonjean, Richard J. Hill and S. Dale McLemore. Chandler Publishing Company, San Francisco, 1967.

Scales for the Measurement of Attitudes

Marvin E. Shaw and Jack M. Wright. McGraw-Hill Book Company, New York, 1967.

Handbook of Multivariate Experimental Psychology

Edited by Raymond B. Cattell. Rand McNally and Company, Chicago, 1966.

Quantitative International Politics : Insights and Evidence

Edited by J. David Singer. The Free Press, New York, 1968.

Society, Politics, and Economic Development : A Quantitative Approach

Irma Adelman and Cynthia Taft-Morris. John Hopkins Press, Baltimore, 1967.

The behavioural sciences have developed at a very fast rate in the last two decades. One of the signs, as well as the result, of the development has been the increasing use of quantitative methods. Increasing use of quantitative methods reflects the attempt of the behavioural sciences to become more precise, and to be able to control and predict behaviour. The level of qualification, of course, differs in the various behavioural sciences. Psychology is using more sophisticated methods, and seems to be at the stage of breakthrough in the prediction of behaviour and in reaching for basic integrating explanations of human behaviour; sociology is on the way to using measuring instruments and scales, while political science and anthropology seem to be ready to try and accept some methods for quantifying the behaviour which was usually described by these sciences. Some recently published books reflect these different levels of quantification in the various behavioural sciences.

Two of the recent books on sociological measurement show how sociology is increasingly using standardized scales and other quantitative techniques. *Handbook of Research Design and Social Measurement* is intended to be a handbook of research designs, of methods of statistical analysis and social research, and of selective scales in social measurement. The first two parts of the book, *i.e.,* those concerned with research design and statistical analysis (which cover about one-fourth of the book) contain short pieces from writings of well-known authorities. The various extracts have been woven together with a general introduction in each part, and short introductions to the various sections. Some of the selections are excellent, and will be appreciated by social scientists, but these two parts seem to be rather inadequate for the beginner in social research for whom these have been prepared. The part on guides to statistical analysis gives some formula about correlations, and an extract on non-parametric statistical tests from Siegel, but a student not familiar at all with these methods may not find the material adequate, while the material presented is unnecessary for one who is familiar with such methods. The bibliographies given at the end of the parts may be found useful by those who want to refer further to specific methods.

The best and the main part of the book is the third part, devoted to what is called 'selected sociometric scales and indexes'. This part will certainly be found to be extremely useful by those who are interested in selecting instruments for social research. The various social research instruments are classified under the following heads: social status, group structure and dynamics, morale and job satisfaction, community, social participation, leadership in the work organization, important attitude scales, family and marriage, and personality measurements. In all, 37 instruments have been given in this part. With each instrument detailed information about its various aspects is given, and the actual instruments have been reproduced. A brief description of each instrument covers information about the variable measured, description of the instrument, where it is published, its reliability, validity, utility, and research applications, giving the main references to publications. Since many of the instruments reproduced in this section are not commercially available—they have been taken from journals and other sources—this section will be found to be very useful by social researchers looking for relevant instruments. The last section in this part gives an inventory of instruments used by sociologists, as reflected in papers published in the *American Sociological Review* for ten years, from 1951–1960. This inventory gives a general acquaintance with the type of instruments that have been used by American sociologists during ten years, as reflected in the publications in one important journal of sociology. A short part at the end of the book deals with research costing and reporting, which again is rather inadequate.

The book will be found useful by those who are interested in using objective methods of measurement in sociology and those who are in search of good instruments. This is a welcome addition to the growing literature on quantitative methods in sociology.

Sociological Measurement has used a different method of cataloguing the measuring instruments in sociology. Four main American sociological journals, namely, *American Journal of Sociology, American Sociological Review, Social Forces,* and *Sociometry,* were searched for getting at a list of the main concepts used, and the various instruments employed to measure these by sociologists during the 12-year period, 1954–1965. All the papers and notes published in these four journals for a period of 12 years were content-analyzed, and the reliability was checked by examination of 20 per cent of the issues of these journals independently by two readers. The analysis yielded a list of main sociological concepts and of specific instruments used and referred to for measuring these concepts. In all, 2,080 scales and indices were identified in this analysis, with their 3,609 recorded uses and citations. The various concepts were then classified under 78 conceptual classes, which form the basis of the present volume.

While the four journals are used as a basis for the search of sociological concepts and the measuring instruments, the content-analysis provided various references to these concepts and instruments in sociology and psychology. Thus the book is much wider in its scope, and represents a systematic effort in listing the main sociological concepts used by sociological research workers and explaining some of these concepts more fully, giving some instruments used in measuring these concepts. In some cases, only references are given to the various concepts listed and the instruments used to measure these, while in other cases the concepts are explained in some detail; in some cases the actual instruments used for measuring these concepts are reproduced in the voulme. For example, under 'marital adjustment' three immediate references are given to the main publications during the last two decades, and two indexes of marital adjustment are reproduced with explanation; at the end of the concept citation, is given a selected list of further references to the measurement of marital adjustment in the four journals searched.

Each of the 78 concepts has been further divided into subconcepts, or parts of that concept, and references are given to these and their measurements. For example, under the concept of 'marital adjustment and courtship' there are 28 parts of this concept listed in alphabetical order. A good example of a better treatment of a concept and its measurement is that of 'segregation' to which are devoted 15 pages, containing some indices used in measuring segregation. The handbook has been made more useful by providing cross-references in the conceptual classes, and by a detailed topic-index at the end of the book which lists all the topics covered.

The various scales and indices appearing in the journals over the 12-year period, which total 2,080, are further analysed for frequency of use. As the authors point out, the lack of continuity in social research is reflected by the finding that out of more than 2,000 scales and indices only 47, *i.e.,* about two per cent, have been used more than five times. The instruments and measures used more than five times have been reproduced in the book, giving some details about them. The frequency of the use and citation of these instruments ranges from 91 to 6; the details are given in a table in the introduction. The various scales reproduced have also been listed in the table of contents, which lists all the 78 main concepts alphabetically arranged.

The volume reflects a systematic attempt at searching for the main concepts used by American sociologists and at locating important measuring instruments which have been frequently used and referred to by sociologists. The handbook will be found to be extremely useful by all those who are interested in measurement of social phenomena. The value of the handbook would have been increased if systematic information about the validity, reliability, norms, etc., of the various instruments reproduced had been included. However, the book is a major contribution to the systematic approach to the use of measuring instruments for the most widely used and discussed concepts in sociology, and it will certainly be used as a source book by all interested behavioural scientists.

In psychology, several publications have paid systematic attention to measuring instruments. Buros' famous *Mental Measurement Yearbooks* have continuously improved the systematic cataloguing of measuring instruments in the various fields. Several books on measurement reproduce some standardized instruments as illustrations. But a compilation of instruments in a single field is not available. With the number of measurement devices fast increasing, a collection of instruments for specific fields are greatly needed. *Scales for the Measurement of Attitudes* represents such an attempt for bringing several important attitude scales in one place. This is a kind of a handbook of attitude scales, reproducing several scales with detailed information about them. The book contains two general chapters, one on the nature of attitudes, and the other on methods of scale-construction, briefly describing the problem of validity and reliability and the various techniques for scale construction (methods of equal-appearing intervals, graded dichotomies, summated ratings, scalogram analysis, scale discrimination, unfolding, unfolded partial rank order, latent structure analysis, semantic differential, some of the disguised techniques like the error-choice, sentence completion, and the pictorial technique). These

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various techniques have just been mentioned with very brief, almost annotation-like comments. It would have been much better if this part of the book had been expanded, providing enough details for the reader to become more familiar with these. The last chapter in the book is also a general chapter containing brief comments about the various scales, which have been reproduced in the book, and making suggestions for improvement of attitude scales. Some of the suggestions mentioned are worthy of attention for those interested in construction of attitude scales. The chapter, again, is a short one and could have been profitably expanded further.

The three general chapters in the book occupy a very small space, only 43 pages. These chapters are brief because the scope of the book is different. The main portion of the book is devoted to the various attitude scales. The attitude scales are classified into eight areas (each forming one chapter): social practices, social issues and problems, international issues, abstract concepts, political and religious attitudes, ethnic and the national groups, significant others, and social institutions. Each chapter has a brief general description of the area, followed by various sections which are also listed in the table of contents under each chapter. Thus, in all, 44 different topics are mentioned in all the eight chapters. Brief information about attitudes towards each of the 44 referrents is given, including references to other scales. One or more scales for each referrent are reproduced in the book, with detailed information about the scale, the method of construction, reliability, validity, the population sample on which the scale was developed, number and type of items, and any noteworthy advantages and disadvantages of the scale. In all, 174 scales have been reproduced in the book. At the end of the book is given a 20-page long bibliography of the various attitude scales.

Scales in the various areas have been selected carefully, and several of the scales reproduced are the standard scales widely used. The information given for each scale is extremely useful, containing technical data, with necessary references to the bibliography at the end of the book. In some cases the information about the scale is quite detailed, and this adds to the value of the book. Each chapter ends with a short summary of the position about attitude scales in that particular area.

The publication is a very useful handbook for those behavioural scientists who are interested in attitude measurement. It will be found to be extremely useful by students and research workers alike, and it is hoped that the book will improve the quality of attitude measurement. The high price of the book may deter its use by individuals, particularly in the developing countries. It may be hoped that there will soon be an inexpensive Asian edition of this important and useful handbook.

Handbook of Multivariate Experimental Psychology is a publication at a different level. The book has been edited by Raymond Cattell and contains 30 chapters by authorities on the measurement of complex human behaviour. Cattell has been contributing profusely and consistently to the advancement of objective measurement in psychology, and the *Handbook* is probably the most important contribution from Cattell. Of the 30 chapters, six have been written by Cattell himself, and he has co-authored one chapter. In most of the chapters Cattell has written general introductions, so that the *Handbook* does not appear to be merely a collection of papers by various authors, but has a continuity and reflects the kind of approach Cattell is committed to.

It is extremely difficult to review such a major work; the *Handbook* deserves to be reviewed in detail by several authorities in the different fields covered by the book.

The book consists of two parts. The first part deals with the general discussion of the nature of psychological theory and its relationship with quantitative methods, and the various concepts of multivariate technology: multivariate analysis, correlation analysis, analysis of variance, and factor analysis. The second part is devoted to the application of multivariate analysis in the various areas. In the first part several chapters are devoted to theory-building in psychology through quantitative methodology. Cattell has contributed three chapters in the beginning of the book which discuss the major psychological theory and others in relation to quantitative methods, but Cattell uses his own concepts of quantitative method and the BTRM (Basic Data Relation Matrix) Data Box. Cattell's emphasis on five sources of data (person, focal stimulus, environmental background, response process, and observer) is a major contribution to research strategy. Horst discusses the overview of the multivariate analysis methods, and Anderson discusses regression and discriminant analysis as a part of the basic statistics. Cattell has expounded the use of factor analysis while its relationship with analysis of variance has been discussed by Burt. Analysis of variance has been treated in an excellent way by Jones.

The application of advances in multivariate analysis technology has been discussed for learning (Tucker), perception (Hake), human cognative abilities (Pawlik), personality theory (Nesselroade and Delhees), motivation (Horn), physiological psychology (Royce), biological concepts of mental processes (Mefferd), behavioural genetics (Thompson), child development (Coan), groups and organization (Bereiter), culture and political-economic psychology (Cattell), language behaviour (Miron and Osgood), educational research (Bock), industrial and military psychology (Sells), and clinical psychology (Cohen).

The marked bias in the book towards Cattell's own theoretical and methodological position is understandable. However, at some places Cattell is almost partisan, rejecting other significant contributions in the field (for example, his treatment of factor analysis in Chapter 6). The use of less familiar terminology and creation of a new jargon are not new for Cattell, and this seems to be one reason why Cattell's contributions, unique and outstanding as these have been, have not diffused widely among the psychological research workers, much less among other behavioural scientists.

The book has an excellent bibliography of 1,601 items at the end, and a detailed subject index. The *Handbook* is a major contribution to and a landmark in the objective quantification of behaviour, and for several years it will remain a major reference book for research workers interested in the application of advanced multivariate analysis technology to human behaviour.

A group of political scientists, interested in the study of international political behaviour, has been responsible for a series, the *International Yearbook of Political Behaviour Research.* The sixth yearbook in this series, *Quantitative International Politics: Insights and Evidence,* is particularly significant as a milestone in the development of political science, and is indicative of the attainment of maturity of political science as a behavioural science. Several attempts have been made in the past to apply the various behavioural science research methodologies, particularly quantitative techniques, to the problems in political behaviour. However, in the past most of such researches were done by non-political scientists, psychologists and sociologists, who were interested in the study of political behaviour. The present volume for the first time presents researches using quantitative empirical methodology exclusively by political scientists. This volume is a collection of several empirical studies made by political scientists on international problems. As Heinz Eulau has pointed out in the preface of the book, "Political scientists, at long last, have become social scientists.... While this volume, then, has been written *by* political scientists and historians, it was written *for* all social scientists interested in international political phenomena, regardless of their professional affiliation." The volume is a significant contribution to the area of behavioural sciences, as it opens new possibilities of research in an important area of human behaviour, using objective methods. As Eulau points out in the preface, "It looks as if the time has come, finally, when political scientists can pay back to their fellow social scientists in the other disciplines some of the intellectual debts owed for so long."

The volume contains ten empirical studies at three levels, *viz.,* the individual decision-makers' level, the international level, and the systematic level. In the general introduction the editor discusses the use of data, and procedures to collect and analyse empirical data by political scientists at these levels, as reflected in the studies contained in this volume. As the editor points out in the introduction, several organizations are emerging in the U.S.A. for collecting and preserving empirical data for use by those who are interested in the analysis of political and related behaviour. Some such organizations are the Inter-University Consortium for Political Research at Michigan's Survey Research Centre, the International Data Library at Berkeley's Survey Research Center, the Yale Political Data Programme, the International Development Research Centre's Data Archive at Indiana, and the Cross-National Data Bank in the Public Affairs Research Institute at San Diego State College. The possibility of better research in political behaviour has increased with the availability of data at such centres.

In the first part of the volume, the focus of attention of the researches is the individual in the role of decision-making for certain important policies. Rosenau sets up ten hypotheses about how American senators from the two parties will behave *vis-a-vis* the Secretary of State. The hypotheses are derived from the data during the Acheson era, and these hypotheses have then been tested from data available during the Dulles era. Most of the hypotheses stand well against the tests of statistical significance. It is interesting that the hypotheses are based on the behaviour of the various senators as reflected in their speeches made in the senate, and these are quantified to give reliable categories of behaviour. Alger has focussed on the behaviour of the United Nations' delegates with regard to their Fifth Committee colleagues. He has tried to predict the behaviour from the delegates' own role and status in the committee and from their nations' fiscal and administrative role in the organization. The interaction processes have been charted for some meetings to show the interaction patterns, and correlations have been worked out between nations' participation in the Fifth Committee and investment in terms of money and men in the United Nations, and the various national characteristics. A correlation matrix with 27 variables has been presented in the paper. Zinnes focuses on the role of policy-making elites in the various governments most involved in the crisis which preceded World War I. Zinnes sets up four hypotheses, the first two concerned with the intrastate expression of hostility, while the last two hypotheses are focussed on the interstate interactions, particularly of the effects of one state's hostility on another state's perception and expression of hostility. In testing the hypotheses with data from six states, analyses were performed.

The second part contains four studies which focus on decision-making at the national level. One study attempts to find the relationship between the role behaviours of the national military organizations and economic transactions, which accompanied the conflict-escalation process, during 1914 crisis.

Another study has attempted to codify sequences of the U.S.S.R. and the U.S.A. in a series of Berlin confrontations during the period between 1948 and 1960, while the two other studies attempt to predict the military foreign conflict behaviour of a nation on the basis of its various internal attributes. Rummell sets up 11 hypotheses relating the foreign conflict behaviour of a nation to the various internal attributes: economic and technological level, international communication, cooperation with other nations, totalitarianism of the government, power, instability, military capabilities, psychological motivation, values, number of boarders, and combination of various above characteristics. Thirteen foreign conflict measures have been used. The hypotheses have been tested with the data from a project called Don Project, including factor analysis of some significant data. The paper in this volume is too short to do justice with the various important hypotheses set up for testing. Another paper by Hass attempts to relate societial factors and international aggression from data from ten countries during the period 1900–1960. The paper has used a structural-functional theory as its theoretical model. The dependent variable has been very systematically defined, and it has been very ably quantified using content analysis of documents available. About 80 different variables were examined and intercorrelations were worked out. Factor analysis of the data showed that no two variables were located on the same dimension. Results of an interchangeability check with the data used in the study reported revealed low intercorrelations, indicating that less than 25 per cent of the variance in one variable was accounted for by another. The three main groups of variables retained in the study are: stress (unemployment, and industrialization), strain (suicides, homocides, and alcoholism deaths), and military behaviour (expenditures, war frequency, and war aggressiveness). The paper makes significant contribution in suggesting a methodology of coding data for political behaviour, a methodology for analyzing data, and the empirical implications of such researches.

The third part of the book is concerned with analysis at the level of the system. While one paper attempts to find the relationship between alliance aggregation patterns in the international system and the amount of war which the system experiences, another paper attempts to delineate international regions on the basis of the data available about various countries of the world. The latter one has used factor analysis for delineation of the various regions. Factor analysis of data on 54 variables from different countries of the world has yielded five factors as follows (the percentage of variance accounted for by each factor being given in parentheses): economic development (31), communism (11), size (7), catholic culture (5), and intensive agriculture (6). Those socio-cultural indices which had coefficients of correlation of more than

·6 with one of the four dimensions (there were 29 such variables) were analyzed, using Q-methodology. The Q-analysis matrix was transposed, giving information about what countries were like each other over a variety of indicators. The loadings on the four factors for the various countries are given, indicating that the countries are clearly grouped according to the high loadings they have on one particular factor. Five countries remain unclassified, while all other countries are grouped into five regions: Afro-Asia, Western Community, Latin America, Semi-Developed Latins, and Eastern Europe. Japan, Greece, Israel, Malta, and Trinidad are included in the Western Community while the Philippines is included in Latin America. Spain and Portugal fall in the region of Semi-Developed Latins. The study is significant in demonstrating how quantitative methodology can be used in delineating regions for specific purposes. Another paper in the last part deals with the relationship between transaction flows and tensions as reflected in the war.

This volume is a welcome addition to the growing literature of behavioural science research methodology. The volume uses a novel method of providing a subject index by listing the various entities, and giving information about comparisons, interdependence, and interaction of the entities. The volume has a classified, select bibliography of quantitative methodology in political science at the end. The bibliography is classified, using two axes: type of researches (studies which generate new data, and studies which are largely conceptual), and the behavioural sciences (political science and history, and psychology and sociology). It may be hoped that this volume will stimulate new studies using quantitative methodology in political science and history.

An attempt to use quantitative behavioural science methods of analysis for understanding the stages of economic development in various nations is represented by *Society, Politics, and Economic Development: A Quantitative Approach.* The book attempts to get at the underlying relations between various social, political, and economic factors, as reflected in the level of economic development. The study is based on an analysis of 41 indicators of social, economic, and political development in 74 developing countries. Most of the data has been taken from the period 1957–1962.

Factor analysis has been mainly used in the study. The book contains one chapter describing how the social-political and economic indicators were selected, and another describing the technique of factor analysis and its application in studying patterns of such interrelationships. Then follow the chapters giving details of the results. Factor analysis of the 41 indicators yielded four factors. Factor I is interpreted to represent the industrialization-urbanization process, "the processes of change in attitudes and institutions associated with the breakdown of traditional social organizations". Factor II is interpreted as representing the evolution of participant political institutions, political development along democratic institutions, and "an increase in this factor may be interpreted to represent a movement along the scale that ranges from centralized authoritarian political forms to specialized mechanisms capable of representing the varied group interests of a society and of aggregating these interests through participant national political organs". Factor III is related with the character of leadership, and Factor IV is interpreted as the degree of social and political stability in the past decade. The analysis shows that inter-country variance in various of the 24 social and political indicators is explained mostly by the combination of these four factors. For example, about 70 per cent variance in the *per capita* GNP in 1961 is explained by a combination of these four factors. Factor analyses for Africa, the Near and Far East, and Latin America are separately calculated. The results show that the patterns of factor analysis for these regions are very much similar to the factor analysis for the entire sample. An attempt has been made to develop an index of economic development based on the weightages given to the various indicators on the basis of factor scores. For this purpose, factor scores based on loadings of each of the 12 indicators having high loadings on Factor I have been used. The total index is then utilized to group countries into three main categories according to the level of development: lowest level, intermediate level, and the highest level. Three chapters are devoted to the detailed analysis of data from countries in the three categories respectively, and the last chapter discusses the implications of this analysis for the process of economic development. Some implications for foreign assistance are also discussed, suggesting that at the lowest level of socio-economic development, aid should primarily take the form of "capital assistance and capital projects specifically designed to increase the size of the modern sector and to increase the production and facilitate the distribution of cash crops". It is suggested that foreign assistance for countries at the intermediate level should include "major capital project aid for industrialization and expansion of transportation and power networks and technical assistance to improve financial institutions," and should also include programmes especially adapted to the individual country to alleviate social unrest and political instability, for which assistance to improve social conditions or budget support and assistance to public administration may be useful. As far as the countries at the highest level of socio-economic development are concerned, it is suggested that foreign aid should be given "in the form of programme assistance", emphasizing "the building of economic institutions, the transfer of modern technology, and help with development planning". One significant statement with regard to the findings of the study is worth noting: "It is neither the type of political system or the political orientation of the government which is important to short-run economic performance. The key political criterion in terms of which a country's capacity to develop economically should be just is the potential of its government to effectively execute progressive economic programmes."

In the appendix appears the list of 41 indicators used in the study, and correlation matrices for social, political and economic indications for the total sample and for samples of countries grouped in the three levels of socio-economic development. The book is a significant contribution to understanding the complex question of development. The significance lies in its contribution to the real interdisciplinary approach to the problem of economic development, and in broadening the understanding of complex human behaviour. The book represents a bold attempt in using quantitative methods, mainly factor analysis, creatively, in trying to unravel the complexity of development processes. This seems to be almost a first step by economists in the direction of bridging the gap between pure economic analysis and more complex behavioural science research. Behavioural scientists will warmly welcome this book, and it may be hoped that more research in this direction, using such quantitative objective interdisciplinary methods, will be forthcoming.

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The High School Student

The Emerging Youth

B. G. Desai. Popular Prakashan, Bombay, 1967.

The youth of any time provides a fascinating subject of study. The interest and importance of the study are heightened during the contemporary period of rapid socio-economic changes, particularly after the Second World War. All over the world, there is the phenomenon of confrontation between the younger and the older generations. In some countries, probably, it has taken the shape of a revolt. In some others, it is manifesting itself in expressions of protest, sometimes violent and sometimes non-violent. While the youth in general is a fascinating group in itself, the student youth is particularly emerging as a power to reckon with. The term 'student power' has come into vogue in politics, sociology and other social sciences. In this context, the current study by B. G. Desai of the 'emerging youth' is of contemporary significance.

The author has made in this book a descriptive study of the high school youth. He has looked into the social setting from which the students come, examined the student and his habits, and determined his attachment to and his place in the family. Further, the author observed the impact of education on the emerging youth, particularly in regard to his estimation of himself and his parents as also his educational, occupational and other aspirations.

The author has adopted the survey method, with a questionnaire containing 48 questions, with sub-questions under many of them. The questionnaire was devised in Gujarati and administered to the students of Classes X and XI in high schools. The sample was selected from boy students of 52 high schools of Baroda District in the year 1960–61. A sample of a little over eight per cent was taken. The author personally administered the questionnaire with the cooperation of his assistants and the principals concerned. On an average, it took 90 minutes for the questionnaire to be administered. The results of the survey have been incorporated in the book under seven chapters, with two appendices and a bibliography and index at the end of the book.

The data is presented in the form of several tables under different heads with descriptive accounts of the issues. The first four chapters are factual whereas the fifth chapter analyses the impact of education on the student. Some of the observations in this chapter are interesting. For example: "Thus the rural student finds intellectual, individual and social changes in him on account of education whereas the urban and the city students find intellectual and social changes in them rather than individual change" (page 130). Later, the author refers to the trend of the students to migrate from the rural to the urban and from the urban to the city area, with rising preference for settlement in that order (page 134). In the last chapter, the author confirms some of the popular ideas; for example, that the largest percentage of the student population belongs to the city, that there is a disproportion of upper caste students and there is a preponderance of male students over female students. From this, the author concludes that this distribution not only reflects the present social hierarchy but also suggests the possible future social hierarchy (page 177). About the general criticism that the educated youths do not have aspirations, that they are not thoughtful about their future responsibilities and that they have no plans for their future, the author says that this is not a correct view (page 183). He says that the students "think not only about their immediate future but even regarding what they aspire to be, which place they want to take in occupational set-up and where they would like to settle.... Thus, in the matter of the aspirations of educated youth, we find that they aspire to be higher, better and greater than what they are. This is more emphatically felt in case of city and upper Hindu castes and also intermediate caste students". About the possibilities of realizing these aspirations and about the role of education in the changing society, the author recommends enquiries to be made in future.

While the study of the subject 'emerging youth' is important, it is doubtful whether an attitude survey conducted in a stereotyped manner contributes much more than a confirmation of commonsense ideas about the youth and the impact of education upon youth. It would have been more valuable had the study also focussed its attention upon some student and youth problems relating to educational policies, organizations, and administration with a view to help the public and the legislatures to understand and influence the formulation of plans for improvement of the educational system. Apart from suggestions for expanding the opportunities and providing better equipment for education, we have not been able to identify some of the subtle aspects of educational policy and administration.

There is throughout the book a certain amount of looseness of conception and presentation and expression. For example, the very concept of youth has not been properly defined. No doubt the present study is a survey in Baroda District on the same model as the surveys in Poona, Lucknow and Coimbatore, with a few differences in content. The reason for confining the present study to high school youth in the two higher classes of the high school is explained by saying that the university student was studied by Dr. B. B. Shah and the author therefore felt that there was no point in pursuing the college youth (page 2). Apart from this explanation, there is no discussion of the concept of 'emerging youth' as a universal or a local phenomena. The statements that the youth of any country plays a pivotal role in shaping the destiny of that country or that the educated youth is bound to occupy positions of importance in times to come are more assertions than conceptual discussions.

A statement like the one on page 3, "It (the city) has unlimited wealth" comes as a loose expression in a systematic study. There is nothing striking or of significance in the methods of analysis and presentation of tables and descriptive accounts in the interpretation of the tables. The survey method has progressed greatly in sophisticated techniques of analysis. Persons undertaking survey research will have to bring a more subtle and sophisticated analysis to bear on data collected after a heavy investment of time and resources for field study of an important problem like the emerging youth. The present study, originally submitted as a Ph.D. thesis, could be considered as a preliminary attempt and the Ministry of Education, Government of India, and the National Council of Educational Research and Training, whose grant has enabled the publication of the present volume, should encourage the author and others like him to undertake field studies as a team with greater sophistication of data collection and analysis.

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PURPOSE: The **Indian Educational Review** is published twice a year, in January and July, by the National Council of Educational Research and Training, New Delhi. The purpose of the journal is to provide a medium for dissemination of educational research and exchange of experience between research workers, scholars, teachers and others interested in educational research and related fields and professions.

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Tables, charts and graphs should be finalized carefully before sending. They should be clearly and accurately captioned and inked to size and their places designated in the manuscript.

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ABBREVIATIONS

In the name of journals cited in references and bibliographies, prepositions and conjunctions have been generally avoided, and the following abbreviations have been used:

Abnorm.	Abnormal	*Med.*	Medical
Amer.	American	*Monog.*	Monograph(s)
App.	Applied	*Occup.*	Occupational
Br.	British	*Pers.*	Personality
Bull.	Bulletin	*Personn.*	Personnel
Canad.	Canadian	*Psychol.*	Psychology Psychological
Charac.	Character		
Clin.	Clinical	*Rep.*	Report(s)
Consult.	Consulting Consultation	*Res.*	Research
Edu.	Education	*Rev.*	Review
Educl.	Educational	*Sec.*	Secondary
Engg.	Engineering	*Soc.*	Social
Exp.	Experimental	*Sociol.*	Sociological
Guid.	Guidance	*Statist.*	Statistical
Ind.	Indian	*Stud.*	Studies
Measmt.	Measurement	*Univ.*	University

The Sociology of Education— Some Problems and Perspectives for Research in India

M.C. Sekhar

The author considers education as a social institution belonging to the same category as the economy, social stratification, political system and the family. He discusses the interaction between these institutions and the dilemmas of educational sociology in India and points out some areas for research.

The aim of this short note is to treat education as an independent, dependent and intervening variable with reference to economy and society. It is also proposed to formulate a few problems for research along these lines.

Education is one of the social institutions in the contemporary situation of modernization. As such it performs a function in the sense of creating opportunities for change. In this process it has become a social institution, to be treated as belonging to the same category as economy, social stratification, political system and the family. It is no more considered as a perpetuator of *status quo* but as a harbinger of social change. The linkage of social and economic development with education provides ample evidence of this transformation. In fact, Durkheim earlier suggested that educational change is linked with social change.

As an institution education is analytically distinguishable from the institutions of economy and society. To understand the interaction of education with society and economy, education is treated on three levels, namely, as an independent, dependent, and intervening or mediating variable.

As an independent variable education has its own institutional system. For example, the institutional complex of schools, colleges and universities, teaching methods, curricula, the teacher-student relationship, and the content of education form its core. But these are not as independent as they seem to be at first glance. As a dependent variable education is dependent upon social structure, social values, traditions, etc., and on economy for its sustenance. As an intervening variable it mediates between social stratification and economy. The needs of the economy in terms of manpower are supplied by the system of education. Likewise, its personnel are recruited from the existing social structure which in turn is influenced by education.

Social mobility is effected by education, while a new status system may be created through the mediating function of education. Likewise, changes in one institution influence changes in the other institutions.

It is in this sense that we try to employ 'education' as one of the social institutions, meaning thereby that education is embedded in social dynamics. The goals set by the society and the implementation of such goals through the economy are factors which are to be considered as 'sprouts' of the interactional situation.

In India, as some of the social goals, we may mention social justice, universal education, non-discrimination, economic growth and equitable distribution of wealth, industrialization, nation-building, the widening of mobility channels, etc. As a consequence of these social goals, the economy is to be expanded in terms of occupational differentiation. This in turn is dependent on the quality and content of the manpower, which is supplied by the educational institutions. This occupational differentiation is to be achieved through the mechanism of social mobility in Indian society. The stratification, however, in a traditional sense was predominantly based on ascription. In the context of the modernization of the occupational system, ascribed status is likely to be replaced by achieved status, especially in a socialistic framework of society. In this framework the mobility of individuals and groups is brought about, thus creating new stratification. But this process is not so smooth as it appears.

Considerations of economic development and growth put a premium on the optimum utilization of resources. But the societal value of humanistic universal education clashes with the optimum utilization principle of the economy. This often leads to the dilemma of educational planning in an underdeveloped country like India. For example, through the manpower need-requirement, the economy cannot afford the luxury of universalization of education. Though universal education may pay dividends in the long run, economy cannot afford to allocate beyond certain levels resources for the educational development in the short run. Not only that. At a given period the aspiration levels of the people and the capacity to absorb them in the economy do not tally with each other. Generally, it is a well-known fact that educational institutions turn out a greater number of people than the economy can absorb. The situation can mainly be attributed to the aspirations of the people concerned. Thus it may develop into an anomic state of affairs, where social policy and economic goals are at variance. Economic goals alone cannot precede the socially set goals of the society. Otherwise, there will not be social mobility.

Central to the analysis of the complex relationship between economic and social goals, is the development of motivations. For the understanding of motivations, social layer, caste, rural-urban differences, proximity of educational institution, family type, income group, etc., are important. It is often quite convincingly said that father's occupational role is important in setting the pace for the son's motivation in terms of occupation. It is also said that social strata influence the levels of aspirations of the people. Likewise, caste affiliations and rural-urban differences make a big difference in throwing up challenges for individuals.

The above discussion may be summarized into the three dilemmas of educational sociology :

Universalized education	vs.	allocative constraints of economy
Generalized diffuse education	vs.	specific task-oriented, skilled educational needs of the technology
Ascribed status	vs.	achieved status

In the first dichotomy, education is dependent upon allocations from the economy. Limited resources and the humanistic goal of universalized education are at variance. Limited resources and funds hamper the goal of universal education. In the second dichotomy the technological needs put a premium on specific, task-oriented, highly skilled manpower to run the industrial complex efficiently and productively. But this emphasis is at variance with the generalized, diffuse education which prevails in the country. As things stand only people at the upper layers of the stratification could supply the highly skilled manpower to the industrial needs because of the easy access for them of such education. This sets at nought the social mobility principle of ascription *versus* achievement. A vicious circle thus develops between social justice and the technological needs. But if the channels are to be kept for universalized social mobility in terms of achieved status, economy cannot afford to allocate resources and opportunity in a given period.

Easy solutions to the above dilemmas are bound to fail and will lead to dissatisfactions and tensions in the social structure. A cursory review of the literature on the subject shows that there is a lack of awareness of these dilemmas in the empirical studies.

In the literature on the subject it is found that nearness of an educational institution develops motivation in the lower strata to get educated and to aim high. But sometimes it is also found that poverty stands in the way of the lower strata getting educated. Some suggestions are offered that economic debility should be removed first before education is introduced. It is also found that unemployment is a widespread malady amongst college graduates. It is no wonder that, as a consequence, the strife that develops around the campus is as fierce as any trade-union war. It is observed that there is wide chasm developing between the younger and the older generations during the period of social change. Generational disharmony is also a product of education and, consequently, the aspirations. In selecting the occupations students often have shown greater preference for the professions with a high social prestige rating rather than the economically more productive ones. These preferences have varied from stratum to stratum and from urban to rural areas. Elites are said to be forming with the help of educational attainments As a consequence of this perception that one can improve his status, a desire has developed amongst the lower strata to go in for education. The generated desire at the lower level and the economic constraint at the top produce a conflicting situation between what is aspired and what is realistically possible.

It is imperative to know how and when social policy produces impossible demands on the social structure. However, it should be taken axiomatically that aspirations and valued goals always outstrip the limited possibilities of economy at a given period. It may be of interest to know how economic possibilities could be built into the realization of some of the goals of the social policy. Interesting results may come if family motivation is investigated into. In the development of educational institutions it should be emphasized that social mobility channels be kept open in order that there may be unhindered flow of incumbents from one stratum to the other. As investigation into the social institutions will offer clues for the group and individual motivations and also for the actual fulfilment. Education as an institution offers further possibilities in developing and controlling the motivations. The enmeshing of three levels of education with economy and society could, if properly investigated, give the lead for the understanding of the institutional implications during economic and social development.

As a conclusion to the discussion above, a few areas of research may be mentioned:

1. To what extent is there intra-, intergenerational mobility?
2. In what strata of society is the mobility most pronounced?
3. What avenues are used in the process of social mobility by the different strata?
4. What type of educational institutions produce what kind of social mobility?
5. Is education a selective agent in the formation and preservation of social strata?
6. How is the content of education geared to the development of achievement-motivation?

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University Administration

Y. D. Khan

Student unrest in the universities, both abroad and in India, has led to a serious ferment and re-thinking on the student-university relationship in responsible quarters. In this paper the author focuses attention on an important factor in this situation—the system of university administration. He critically examines the shortcomings of the existing system, suggests how it could be improved, and stresses the need for proper recruitment and training of the non-academic staff of universities.

The wave of student unrest, and, in some cases, of student revolt, which has disrupted academic life in some universities not only in this country but also in the West, has caused a flutter, of no mean proportions, in the academic dovecots and has led to the emergence of a new perspective on student discipline, the student-staff relationship and the whole spectrum of academic work. It has also set in motion re-thinking on some of the important aspects of academic management and a re-appraisal of the values which constitute the basis of academic life. Even British Universities, noted for centuries for their conservative and traditional approach to academic problems, have not escaped unscathed as a result of student unrest in that country, which has led to a "minor revolution" in certain universities of England and Wales and the evolution of a "new charter", as announced last October by the National Union of Students and the Committee of Vice-Chancellors. This charter embraces wide-ranging issues, from career advice to the highly sensitive question of disciplinary procedures, and includes, among other things, the acceptance of the proposal to reduce the age of majority, directly affecting the relationship between students and university authorities. This important step cuts across the very basis of the concept of universities acting in *loco parentis* and being in a position to guide and dictate to students. The charter is also intended to revolutionize the whole concept of student discipline and to bring it into line with the principles of natural justice so as to provide for student participation in disciplinary procedures. Another change of a major significance visualized is to enable the views of students on curricular courses, teaching methods, major organizational matters and issues concerning the planning and development of the university, to be taken into consideration by the university authorities. A highly sensitive area affected by the new charter is student membership of University Councils, Senates and Committees.

The recent student revolt in France and in other countries of Europe and in some universities of the U.S.A. is far too well known to need any

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elaboration. The student upsurge in France has shaken to its very foundations the whole system of Government, and the French Cabinet and President De Gaulle have recently approved a new measure enabling students, teachers and the general public to have a greater share of control over the State-run schools and the university system, thus bringing to an end the authoritarian concept which was a prominent feature of academic life in the past.

The far-reaching changes in academic life envisaged in the West cannot leave Indian universities altogether unaffected. Student unrest in some of the Indian universities, particularly in the North, has already led to a serious ferment and re-thinking on the student-university relationship in responsible quarters. The current wave of revolt is ascribed generally to a variety of factors such as uninspiring and wooden methods of teaching, inadequacy of library and laboratory facilities of a proper standard, the continuing pressures on available classroom and living accommodation and the general deterioration of academic standards. There is a sub-stratum of truth in these charges, but it is surprising that attention does not seem to have been focused so far on another important and vital aspect of this question, which, among other things, is also a contributory factor—this is the system of university administration, which, as it stands at present, leaves much to be desired and has its repurcussions on the whole field of academic management.

It is not merely those deeply involved in university administration but also those observing academic affairs from the sidelines, who are best placed to assess the position objectively and to pinpoint the weak spots in the administrative system in Indian universities. I share the view of Lord Tedder that "sometimes the man on the touch-line sees things the players don't see" [1] and is in a better position to look beyond the trees to the wood as a whole.

A thorough and critical re-examination of the problem of university administration in which all schools of thought and shades of opinion are represented, is, therefore, urgently called for. Before, however, the question of a large-scale reorganization of the administrative system is taken up, certain basic facts regarding university organization need to be borne in mind. University organization has a triple basis: student, teachers and the administrative staff. But, unfortunately this trinitarian concept does not seem to have received that measure of attention which it deserves. Samuel Capen (1953) in his book *The Management of Universities* has observed:

> Educational administration is a necessary institutional function . . . . its sole purpose is to facilitate the processes of teaching and research and to promote improvements in these processes. (Capen, 1953.)

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[1] *Seventh Congress of the Universities of the Commonwealth*, 1953: *Report of the Proceedings*. The Association of the Universities of the British Commonwealth, 1954, p. 4.

UNIVERSITY ADMINISTRATION

It would not be altogether incorrect to say that university administration, or as it is more aptly called "academic management", in which students, teachers and the administrative staff play a decisive role, is essentially a typical example of house-keeping, calling for a close and active participation of all the principal elements constituting the organization. A system of university administration, if weak or soft-centred, which does not conform to this basic requirement, is bound to have repercussions of a serious nature on the whole field of academic work, leading eventually to unrest amongst students and the staff. Sir Robert Aitken (1966) in an interesting pamphlet captioned The *Administration of a University,* which is essentially a case-study of the administration of the University of Birmingham, has remarked:

> The test of its (system of university administration) aptness for its purpose is whether it allows the maximum of freedom within wide limits, whether it finds the optimum point of balance between diffusion and concentration of responsibility for academic management and whether it keeps the tension between the individual and the organization down to a level that is healthy for both. (Aitken, 1966.)

Apart from a few universities, which were established round about the middle of the last century, most of the universities in India are comparatively of a recent vintage, and the organization of a large number of the latter universities is based broadly on the pattern of the older universities, which have reached their present position by a gradual process of historal evolution largely by their own particular milieu. The American universities also stand, to some extent, in a similar position. As observed by Dr. J. L. Morrill, President, University of Minnesota:

> The American tradition of higher education, transplanted in origin from Cambridge and Oxford and influenced by the Scottish and (to a lesser extent) the French examples, at one stage strongly modified by the impact of German Universities of the early 19th century, has been most steadily shaped by the social and political needs and forces of its own milieu.[1]

American universities have, however, been adjusting themselves to the changing conditions and evolving systems of administration best suited to the nature and character of their work. So far as Indian universities are concerned, a study in depth of their administrative structure, methods and techniques of work, financial control, the relationship of the administrative staff vis-a-vis the academic personnel and the degree of participation in decision-making at policy level of the principal elements in the organization, does not seem to have been seriously attempted so far. Unrest in, and dissatisfaction with, academic management has now reached a stage where a close and clinical review of the whole field of University administration is called for. In recent years, Indian universities have come in for serious

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[1] *Seventh Congress of the Universities of the Commonwealth*, 1953, op. cit., p. 64.

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criticism from all quarters, and today they stand in a position broadly resembling that of the proverbial "wily fox of the British countryside at the close of a day's hunt; it is assaulted from all sides", as observed by Dr. Carlos P. Romulo of the University of Philippines. It is gratifying to note, however, that the question of improving university administration has recently been engaging the attention of responsible bodies such as the Inter-University Board of India and Ceylon and the University Grants Commission. The Inter-University Board in its annual report for the year 1965-66 referred to the project undertaken by the Board concerning university administration and observed:

> While the problem here, in one sense, is immense, in another sense it is a problem that can be tackled relatively easily. The universities being smaller units, it is possible to introduce new techniques, streamline methods and orientate the outlook and methods of work of our senior administrators within a short time. As a first step in this direction, a working group on university administration has been set up.

In its 42nd Annual Meeting held in December 1966, the Inter-University Board welcomed the recommendation to constitute a working group on university administration and resolved that appropriate steps be taken to implement the recommendations of the working group. In the Conference of Vice-Chancellors, convened by the Ministry of Education, Government of India, and the University Grants Commission in September, 1967, a passing reference was made in the speech of the Chairman of the University Grants Commission to the important question of improving the efficiency of university administration and making use of modern Organization and Methods techniques in dealing with university management, and to the proposal to set up a committee to look into this important subject. He also suggested that some universities could organize Organization and Methods studies to look into their administrative methods and arrangements, record-keeping, procuring of equipment, and arrangements for holding examinations. As suggested by the Estimates Committee of Parliament in its 101st report, a committee has, it is understood, been recently set up to conduct a horizontal study of the administrative structures of the Central Universities, with a view to laying down the standard of pattern of administrative reform. The Education Commission of 1964-66 has also devoted some attention, though sketchy, to this problem and has observed:

> It would be of real value if in some selected universities, groups of interested and knowledgeable persons, academic and administrative, could join hands to study seriously problems of academic government and administration and suggest ways and means to bring about a radical improvement in the present chaotic situation. (Education Commission, 1966.)

What precisely is the malaise bedevilling the administrative organization of the universities, is not difficult to diagnose. Those closely associated with university administration are only too well aware that, operationally, universities work through committees. As a matter of fact, "the committee system" in universities is an ubiquitous and dominant feature of university administration. Apart from the meetings of statutory university bodies, there is such a proliferation of committees and sub-committees that the engagement books of university officials and academic staff are usually far too full, leaving them hardly much time for quiet, sustained and constructive work. Apart from any other considerations, the welter of committees and sub-committees involves heavy administrative costs. As observed by Sir Lawrence Bragg,

> It is a very costly business to use the time of presumably highly intelligent and highly paid people like ourselves to sit on a large number of committees. Taking the average committee, if one counts the time spent by the Secretary and the Chairman in preparing the agenda and the time which the staff put in studying the agenda and attending the meetings, the cost must be something like £ 100. If further we reckon—and I think these figures are of the right order—that on 150 days in the year there are six committees of one kind or another in the average civic university it must be realized that £ 90,000/- a year is being spent on committees, apart from other costs of administration.

A solution suggested by Sir Lawrence is that committees should be "reserved for questions of strategy and policy", and that

> one could get a good measure of the efficiency with which the administration of a university is carried out by applying a micro-metre gauge to the agenda of the committees. The best committee is one whose agenda is on half a sheet of notepaper, with perhaps half a dozen sheets of explanatory notes, bringing out the main points which the committee has to consider. When we see an agenda about an inch thick, it is a sign of the breakdown of the administration. Such proliferation is a sure symptom of that dread disease 'administrative cancer'. It means that many points of detail are coming up to a higher level which could perfectly well have been settled at a lower one.

Universities work under a democratic constitution and it would be a counsel of perfection to advise the initiation of measures which would altogether eliminate the need to set up committees and sub-committees. But, as observed by Prof. H. R. Burrows (Neta), "in view of the growing burden of university routine meetings of all kinds, one is tempted also to suggest a little reduction in the internal democracy of the university in the interest of greater efficiency and scholarship"[1]. The network of committees and sub-committees in the university organization leaves the academic staff concerned hardly much time for creative activity. Nor does it allow much breathing space for the administrative staff to concentrate on constructive or creative work in view of their preoccupation with the preparation and study of agenda papers, attendance at meetings, preparation of the minutes of such meetings and the need to take prompt action on the decisions reached at such meetings. In the interest of administrative efficiency, it is highly desirable to minimize the number of committees and subcommittees, which at present are set up on the slightest provocation. To achieve this end, a streamlining of the administrative machinery in the university would be desirable. It may also be necessary to amend suitably the existing university legislation so as to ensure that only questions of policy and strategy are referred to university bodies. As remarked by Robert Aitken (1966):

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[1] *Seventh Congress of the Universities of the Commonealth*, 1953, op. cit., p. 78.

> From what has been said it is clear that the optimal distribution of responsibility for academic management is not the most economical of time and effort... Nevertheless time spent on academic management is time lost to teaching and research. It should, therefore, be kept to a minimum that a reasonable diffusion of responsibility will allow. A Committee with specific terms of reference should have as few members as will bring to it the essential knowledge and judgment; to add others, with a marginal interest, is wasteful. . . In bodies which much be large, like the Senate and some Faculty Boards, meetings should be as infrequent as possible, and business should be predigested by small inner groups... Beneath and supporting all this, is the vital work of a Secretariat, preparing papers, recording and giving effect to decisions, and doing everything that does not involve a personal academic judgment. (Aitken, 1966.)

No sounder principle could be adopted which would reduce the increasing burden imposed by the committee system on university administration.

Even those, with a marginal interest in university affairs will hardly hesitate to endorse the view that the usual agenda for the principal statutory university bodies such as the Executive Council (Syndicate), the Academic Council, the Finance Committee, etc., is more often than not, far too heavy and bulky to enable even the most important items therein to be discussed and examined in all their bearings in the meetings of these bodies. It can be stated without any fear of contradiction that in not a few cases the thickness of the agenda exceeds the outside limit of one inch indicated by Sir Lawrence Bragg, foreshadowing the onset of what Sir Lawrence feared the deadly disease "administrative cancer". The decisions reached by the principal university bodies on some of the important questions submitted for their consideration are likely, in such circumstances, to leave much to be desired, with the result that there is a general weakening of university administration, leading to an impairment of the image of the university. It is not generally realized that this is one of the basic contributory factors which, to some extent, at any rate, adds to the general dissatisfaction among the students and the staff with university administration.

The question of the recruitment and training of the non-academic staff of the universities has not been tackled seriously and adequately so far.

As observed by Prof. Joseph C. Scroggs (In Nielson, 1959) in connection with "a programme of personnel administration for the non-academic staff of an American university":

> Non-academic employees of a university perform jobs, which include everything but teaching and the supervision of academic activities. The typical university has clerical, technical, maintenance, research, library and administrative staff members. In order to help each of these members derive an increased sense of personal satisfaction from their position, the university has organized a programme of personnel administration. (Nielson, 1959.)

These tasks include, among others, the "related benefits and working conditions, and orienting and training of them (non-academic employees) to the tasks assigned, keeping them informed about things of interest at the university; and assisting deserving employees to obtain recognition and promotions. In this connection the Education Commission of 1964-66 has laid stress on the need for the University Grants Commission to explore the possibility of setting up an Advanced Centre for Studies in educational planning, administration and finance and has advised provision for short and intensive inservice training courses in educational administration, which does not exist at present.

That the authorities of the Government of India are showing signs, though belatedly, of their awareness of the need to improve university administration, affords room for satisfaction; but as observed by the Standing Committee of the Inter-University Board, it is essential to identify the problems and to prepare a programme of training and orientation on a short-term as well as a long-term basis. In any scheme for the improvement of university administration, provision of inservice training for the administrative personnel of universities needs to occupy pride of place. Unfortunately, the recommendation of the Education Commission for facilities of such training relates to officers of the State and Central Governments engaged in educational administration and not to the various echelons of the administrative hierarchy in the universities. The case for providing such training in the case of the administrative staff in universities is much more strong. There has been in recent years, and particularly since Independence, a proliferation of universities. The number of universities in 1950-51 was 27, and it more than doubled in 1965-66 and stood at sixty-four. With this spectacular increase in the number of universities, provision should have been made to meet the requirements of trained manpower for university administration. This is an example of the weakness of our over-all planning or the lack of it. The result has been that universities have had not, in most cases, the necessary background of experience and have had not, in mostcases, the necessary background of experience and training of the nature required. The methods and techniques of work need to be continually under observation, so that up-to-date and well devised procedures are brought into use to ensure efficient and proper disposal of work. This can only be done if research wings are established and their work is dovetailed with a well-thought-out scheme of training in university administration. In the absence of such provision, hit-and-miss methods are usually employed and the efforts made by individual universities to improve matters often lead to the exploration of blind avenues.

If any scheme of training in educational administration is initiated in the light of the recommendations of the Education Commission, it will be desirable to provide therein for the specialized training of the administrative staff of universities. It is common experience that ticklish and prickly questions crop up in the day-to-day administration in universities, most of which can only be dealt with properly and adequately by trained staff in the light of the university legislation and case-law. The lack of a proper appreciation of the implications of the various statutes, ordinances, rules and regulations and errors in interpreting them lead to embarrassing situations, which not only cause unpleasantness but sometimes end up in litigation. There appears to be an increasing tendency amongst students, parents and university employees to have recourse to the law in matters affecting their interests, in which there is a difference of opinion between the universities and the persons concerned. There have been cases in recent years in which the decisions reached in such matters have been upset by the law courts, which has not only a demoralizing effect on the university administration but leads to a good deal of infructuous expenditure. Another disquieting feature of university administration is the recent trend of obtaining temporary injunctions from courts of law and of thus nullifying the decisions reached by competent university bodies. Courts of law, as a rule, are averse to interference in administrative matters, but when there are procedural irregularities or inadequacies, which sometimes do arise, due to inexpert or inefficient handling of questions, the courts have no alternative but to resort to legal processes to ensure compliance with the principles of natural justice. The case, therefore, for providing for specialized training of the administrative staff of universities stands on unassailable grounds. A coordinated approach in the matter would seem to be indicated in which the University Grants Commission, the Central Ministry of Education and the Universities would need jointly to evolve a comprehensive scheme of training after consulting expert opinion on the subject. Dr. D. Veale, Registrar of Oxford University, in his address on "Administration and Academic Duties" at the 7th Congress of the Universities of the Commonwealth, 1953,[1] has observed that "top-rank administrators must be of first-class quality if cases for decisions are to be presented impartially, completely and correctly, and without a heavy burden of irrelevant detail". Sir Reginald Verdon Smith, Chairman of Council, Bristol University, in his address at the Congress remarked:[2]

> It is of the essence of good university administration that it is not a mysterious process extraneous to everyday academic life, but is a homogenous part of the university. The administrative process necessarily makes demands upon the academics; those demands can be irksome and

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1 & 2 *Seventh Congress of the Universities of the Commonwealth,* 1953 op. cit.

> will be justly criticized if the logistics of administration are inefficient. But, as with any large and complex organization, sound principles for the conduct of business and good methods can facilitate decision, secure effective financial control, and greatly assist Departments to achieve their objectives. Organization and Methods in the university thus merit increasing attention.

Competent administrative process in universities can only be evolved if the administrative staff have the necessary background of experienced and training; otherwise the position of such staff would be similar to that of an amateur cricketer who snatches a few runs in an innings rather than that of a well trained and professional sportsman noted for his polished expertise.

During the past several decades, a sound theory of organization has been developing in America in government administration, and in business and industry and also in academic institutions, known as "functional administration". It means "the organization of functional specialists into a number of coordinate groups. In academic institutions, four such functions, besides general direction or general administration, are coming to be recognized and established: instruction and research, student affairs, public relations, and business affairs". The adoption of the principle of functional administration is leading to "the slow sloughing off" of narrow and antiquated administrative structures and procedures in American Universities and colleges. Functional administration also requires organization, and "organization", as remarked by John D. Dewey, "is nothing but getting things into connection with one another, so that they work easily, flexibly and fully". Organization enables putting things into their proper relationship. It would not be altogether sound to adopt in its totaliy the American concept of functional administration in the academic management of Indian Universities. Nor would it be wise to advocate any such course, but the basic principle underlying the concept is unexceptionable. After careful examination at expert level and with suitable adjustment, if the concept of functional administration is incorporated in the philosophy of academic management, it is likely to lead to the underpinning and revitalization of the administrative system.

Alumni and public relations occupy an important place in the entire area of university administration. Public relations and publicity units are being set up in some of the Indian universities but they need to be strengthened and staffed by competent and trained public relations men. The essential function of a public relations organization is to enable a proper image of the university to be projected and to assist the university in putting its best foot forward. The public are not, as a rule, taken into confidence, to the extent necessary, in the work done by the universities, and this not only keeps the general public in the dark about the important nation-building work which universities are doing, but also keeps up the legend about the 'ivory tower' attitude of the universities, which, in the present democratic set up, can no longer be sustained. It is desirable to maintain a constant dialogue between the universities and the general public so as to secure the fullest possible public support to the various activities conducted by the universities, and a proper appreciation of the value of the work done by the universities.

The foregoing assessment of academic management in universities represents merely a thumbnail picture of some of the aspects of university administration, but this brief review will, it is hoped, stimulate studies in depth of a branch of university organization which so far does not seem to have received at the hands of our intellectual elite that measure of attention which it deserves.

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National Teaching Manpower for School Stage Education : Past Trends, Present Position and Future Growth[1]

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The author studies the changes in the aggregate size of teaching manpower in India during the period 1947-66, the current distributional pattern and the regional imbalances, and attempts to estimate the future growth in the needs for teaching manpower.

The need and importance of the study of changes in the employment and distribution of national teaching manpower at school stage education cannot be overemphasized in the context of long-term plans for expansion and improvement of educational facilities in the economy. Keeping this in view, in the present paper the attempt has been to study changes in the aggregate size of teaching manpower during the period 1947-65 and the current distributional pattern, regional imbalances and future growth in the needs for teaching manpower. However, no claim is made about the firmness of the estimates given in the paper because the statistical information and the assumptions made require further clarifications, and the estimates are presented to show only the magnitude of the efforts involved in the preparation of teachers during the next 15 years.

I

UTILIZATION AND DISTRIBUTIONAL ASPECTS OF TEACHING MANPOWER

In Table 1, we juxtapose growth in the institutional facilities, enrolment and teaching manpower during 1947-66 in the Indian economy. This has been done by presenting data on these aspects for selected years: 1946-47, 1950-51, 1955-56, 1960-61, and 1965-66. The years mentioned in the table have been chosen to study changes between the beginning and the end periods of three Five Year Plans and 1946-47 has been taken as the base for comparison. It is seen from the table that growth in teaching manpower as compared to the changes in the size of enrolment and institutional facilities has been showing two specific trends. These are: (a) the number of teachers has

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[1] This paper is based on work stated in February 1968 as part of an assignment given by Dr. Shib K. Mitra, Joint Director NCERT, and then Member-Secretary of the Review Committee, in connection with a cost-benefit study of the Regional Colleges of Education set up by NCERT.

The author would here like to express his deep gratitude to J. V. Reddy, Technical Assistant in the Department of Field Services for his invaluable assistance in organizing the mass of statistical data required for the present paper.

Finally, the views expressed in this paper are the author's and not necessarily the National Council's.

increased about three and a half times as against the fourfold increase in enrolment, and the two-and-a-half-times increase in the number of institutions; (b) while the mean annual growth rates computed and presented in the table show that the stock of teachers increased at a higher rate as compared to the increase in enrolment, between 1947-56, thereafter growth rates in the stock of teaching manpower have been less than the growth rates of the enrolment. Further, the number of institutions has been increasing almost at a stable rate of about five per cent annually except for the First Five Year Plan when it was about six per cent. The result of uneven growth in the number of institutions, enrolment and teaching manpower has led to the increase in the load for teachers and also increase in the number of teachers per institution during the period under discussion. This shows that, *other things being equal,* the capacity of teaching manpower has been increasingly better utilized during the period. This, of course, is an all-India picture and its regional and State aspects are more important for revealing differences in this direction. But such data of a time-series basis has not been collected and presented in this table. However, we will take up this matter again when we analyse State-wise variations on the basis of cross-sectional data subsequently.

It is interesting to note that the number of teachers employed in school-stage education constituted 97.6 per cent of the total stock in 1950-51, 97.4 per cent in 1955-56, 97.1 per cent in 1960-61 and 97.2 per cent in 1965-66.

TABLE 1

Growth in the National Stock of School Stage Teaching Manpower, Institutions and Enrolment, 1946-47 *to* 1965-66

S. No.	YEAR	TEACHING MANPOWER		ENROLMENT		INSTITUTIONS	
		No. (in 000's)	*M.A.G.R.;*	*No. in millions*	*M.A.G.R.;*	*No. (in 000's)*	*M.A.G.R.*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	1946-47	566	—	17·01	—	190	—
2.	1950-51	731	7·0	23·55	6·9	231	4·7
3.	1955-56	1,031	6·3	31·49	5·8	311	5·9
4.	1960-61	1,388	5·9	44·89	7·0	399	4·9
5.	1965-66	2,016	7·4	67·20	8·0	508	4·8

Note: M.A.G.R.=Mean annual growth rate

Source: *Expansion of Educational Facilities in India,* Education Commission, 1965, p. 20.

Teacher-Institution Ratio

Table 2 shows changes in the number of teachers per institution according to the different types. It is seen from the table that the number of teachers per institution has fallen on an average from three in 1946-47 to four in 1965-66. Further, when we analyse figures given in the body of the table a clear trend is seen that during First and Second Five Year Plans the number of teachers per institution has consistently increased for the secondary and middle schools whereas it has decreased for the primary schools; but during the Third Five Year Plan the trend has been reversed in favour of primary schools.

TABLE 2

Changes in Teacher-Institution Ratio in Primary, Middle and Secondary Schools, 1946-47 *to* 1965-66

S. No.	*Type of Institution*	1946-47	1950-51	1955-56	1960-61	1965-66
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	Primary	2·4	2·6	2·5	2·2	2·6
2.	Middle	5·6	6·3	6·8	7·0	6·7
3.	Secondary	16·6	17·4	17·5	17·2	16·3
4.	All school stage education	3·0	3·3	3·3	3·5	4·0

Source: *Expansion of Educational Facilities in India* (1946-47 *to* 1965-66), Education Commission, 1965, pp. 2—5.

Change in the Sectoral Allocation of Teaching Manpower and Enrolment

In Table 3 we give side by side distribution patterns of teaching manpower and enrolment according to three types of institutions for the years mentioned in the preceding section. It is seen from the table that 71.7 per cent of teachers were employed in primary schools in 1946-47; this figure declined to 52.4 per cent in 1965-66. It is also seen that there was a decline in the share of enrolment from about 77 per cent to 60 per cent during this period. Evidently, the fall in the share of teaching manpower has been greater as compared to the fall in enrolment. It has resulted in the increase in the pupil-teacher ratio from 32 to 38 during this period. It is interesting to note that the increase in the share of teaching manpower employed in the secondary schools has gone almost hand in hand with the increase in the enrolment. As a result, the pupil-teacher ratio during the entire period has stabilized at 25 (twenty-five). Regarding expansion in the middle schools,

TABLE 3

Sectoral Allocation Pattern of Teaching Manpower and Enrolment

S. No.	*Type*	1946—47		1950—51		1955—56		1960—61		1965—66	
		Teachers	*Enrolment*	*Teachers*	*Enrolment*	*Teachers*	*Enrolment*	*Teachers*	*Enrolment*	*Teachers*	*Enrolment*
	1	2	3	4	5	6	7	8	9	10	11
1.	Primary	71·7	76·6	71·8	77·8	67·2	72·9	53·7	59·6	52·4	59·8
2.	Middle	12·8	10·5	11·4	8·8	14·4	12·1	24·9	23·7	25·8	23·8
3.	Secondary	15·5	12·9	16·8	13·4	18·4	15·0	21·4	16·7	21·8	16·4
	Total	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

Source: *Expansion of Educational Facilities in India*, Education Commission, 1965.

it is seen that the share of teaching manpower employed in such schools has increased from about 13 per cent in 1946-47 to 26 per cent in 1965-66. The corresponding increase in the share of enrolment has been from 11 per cent to 24 per cent during the period. Growth in enrolment has outpaced the growth in teacher employment and consequently the pupil-teacher ratio has gone up from 25 to 31 during 1946-65.

Changes in Employment of Teaching Women-power

The participation rates of women-power in the teaching profession have been computed and are given in Table 4.

TABLE 4

Women-power Participation Rates, 1946-66

S. No.	*School*	*1946-47*	*1950-51*	*1955-56*	*1960-61*	*1965-66*
	1	2	3	4	5	6
1.	Primary	13·7	15·4	17·1	17·5	19·5
2.	Middle	14·7	15·1	16·1	24·2	26·9
3.	Secondary	13·3	15·8	18·5	21·0	21·6
	Total	13·7	15·4	17·2	19·9	21·8

As equalization of all types of opportunities is one of the major goals of social policy in the country, it is important to note that participation of women teachers in the education industry has increased during the period 1946-65. It is seen that the participation rate has gone up from about 14 per cent in 1946-47 to about 22 per cent in 1965-66. Again, while the participation rates of women teachers in all the three types of institutions, shown in the table were almost identical, i.e., around 13-14 per cent in the beginning, in the final year 1965-66, it is seen that middle schools employed women teachers which constituted 27 per cent of the total teachers as against the participation rate of 19.5 per cent in primary schools and 21.6 per cent in the secondary schools.[1]

Changes in the participation rates of women teachers are also closely associated with the changes in the enrolment of boys and girls in different schools. From the point of view of recruitment and teacher training, it is worthy of note that as the participation rate of female teachers goes on increasing there is corresponding increase in the withdrawal rates of women

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[1] Incidentally, the census of 1961 revealed that the participation of educated women workers was only 6 per cent in that educated working force.

TABLE 5

Average Annual Salary (as an Indicator of Economic Productivity) of Teachers Employed in Different Types of Institutions, 1950-66.

(Amount in rupees)

S. No.	*Type*	*Primary*		*Middle*		*Secondary*		*GNP Per Capita at Current Prices*		*1948-49 Prices*		*GNP Deflator*	*Cost of Living Index*
		Amount	*Index*	*Amount*	*Index*	*Amount*	*Index*	*Amount*	*Index*	*Amount*	*Index*		
1		2	3	4	5	6	7	8	9	10	11	12	13
1.	1950—51	544·5	100·0	682·4	100·0	1,258·8	100·0	266·5	100	247·5	100	100	100
2.	1955—56	651·5	119·6	808·4	118·5	1,426·6	113·4	255·0	96	267·8	108	88	95
3.	1960—61	872·8	160·3	1,057·3	155·0	1,681·0	133·6	325·8	122	293·3	118	104	123
4.	1965—66	960·0	176·3	1,121·1	164·4	1,791·8	142·4	415·3	156	299·4	121	135	165

Note: Figures in brackets are at 1948-49 prices.

Source: Annual salaries according to types of institution have been taken from Education Commission, *Expansion of Educational Facilities in India*, 1946-47 *to* 1965-66, and GNP per capita figures have been taken from Government of India, *Economic Survey*, 1967-68, A-4.

teachers on account of marriage and other reasons from the employment market. And this has resulted, in fact, in higher withdrawal rates in the teaching profession as compared to other professional categories where the female participation rates are low. This phenomenon is peculiar to the Indian labour market, and may be noted.

II

CHANGES IN THE WAGE RATES OF TEACHERS

Table 5 gives changes in the annual wages and salaries of teachers (at current prices) employed in different types of institutions. The data has been presented by the end and beginning years of the first three Five-Year Plans. In Cols. 8 to 11, figures of changes in income per capita, both at current and constant prices, have been given. In Col. 12 we have presented the GNP deflator, and Col. 13 gives the increase in the cost-of-living index during the 15-year period. The major trends which can be seen from the table are briefly put as under.

The annual wages and salaries of teachers have been increasing at disproportionate rates in the three types of institutions. The growth in the salary of teachers employed in primary schools has been the fastest; it has been followed by increase in the salaries of teachers in middle and secondary schools. This trend appears in the right direction because it bridges a wide gap in the wage rates of teachers employed in different types of institutions. The second trend, which is observed from the figures relating to wages and salaries of teachers in relation to increase in per-capita income, we find teachers in primary and middle schools have gained much more than the increase in per-capita income. When we analyse wage rates of teachers in relation to per-capita income it appears that the differential between per-capita income and the average wage rate of teachers has widened. This perhaps is a major reason which leads to increase in the unit costs at school stage education in the Indian economy. This comparison is indeed based on both sets of data on current prices. Thirdly, we observe, even in real terms teachers have gained much more than the average Indian. The exception to this are the teachers in secondary schools, who appear to be hard hit because of the fall in the real income despite the 42 per cent increase in their average salary during the period. This analysis is based on the results arrived at by applying GNP deflator, as given in Col. 12 to the annual salary data of teachers given in the table. But our results get reversed if we apply the cost-of-living index to the average salary rates. Incidentally, it may be mentioned here that the Education Commission in its report *Education and National Development*[1] (p. 47) used the cost-of-living index to the current wage rates of teachers. Now we know that the cost-of-living index for the working class is a poor indicator for arriving at the real income of teachers during the period under study.

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[1] *Education and National Development.* Report of the Education Commission (1964-66), New Delhi, 1966.

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Therefore, it may be desirable to base our analysis on the basis of GNP deflator. The last trend observed from the data is relative overpayment to the teachers as compared to GNP per capita. Further, such a high disparity between the average annual salary of a teacher and national income per capita is not supported by the evidence in this area in more advanced countries like the U.S.A. or U.K.

III

HUMAN CAPITAL IN EDUCATION INDUSTRY, 1965

In an economic analysis of human capital it is desirable to present a single estimate of the stock of the manpower employed in a particular sector of an economy. Further, we know that the theoretical refinements made in the concept and measurement of physical capital have not reached a satisfactory stage so far and attempts in recent years in the field of measurement of human capital have been very elementary. Still, we will try to present here an approximate picture of the total human capital employed in the education industry vis-a-vis the remaining sectors of the Indian economy. As a first approximation of the total stock of teaching manpower employed in school stage education we present in Table 6 the distribution pattern of teachers according to sex. The figures given in the table are based on a nation-wide survey,[1] conducted by the NCERT and relate to 30 December 1965. One more clarification is necessary to understand the significance of the figures presented in the table. The NCERT report for the first time presented data in terms of stages of education, designated as, 'primary section', 'middle section' and 'secondary section'. Therefore, comparison of the institution-wise data given in the publications of the Ministry of Education can't be made with the data presented in the table. It is seen from the figures that the total number of teachers employed in school stage education numbered 1.9 million and the participation rate of women teachers was as high as 22 per cent. It is also seen that 63 per cent of teachers were employed in primary sections and a little over one-fifth of teachers was almost identical with the distribution pattern of male teachers except for some difference at the secondary stage.

In Cols. 8 and 9 we have presented data derived from an entirely different source, i.e., Ministry of Education, and it has been given according to types of institutions. It is to be noted that the total stock of teachers and its break-up according to types of institutions, as given here relates to 31 March 1966. The difference between stock as revealed by the NCERT Survey and that by the Ministry of Education is about 2 per cent, and the distribution patterns given in Cols. 7 and 9 are also dissimilar except for middle sections. These differences in the two sets of data may be noted. It is however gratifying to note that the sex-wise distribution of the total stock was identical in the data collected through two entirely different agencies.

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[1] *Second All-India Educational Survey*, NCERT, New Delhi, 1967.

TABLE 6

Total Stock of Teaching Manpower According to Sex, 1965

S. No.	*Level*	*Teaching Manpower*		*Teaching Women Power*		*Total Manpower*		*Type of Institutions*	
		No.	*Percentage*	*No.*	*Percentage*	*No.*	*Percentage*	*No.*	*Percentage*
	1	2	3	4	5	6	7	8	9
1.	Primary	928	62·1	268	64·7	1,196	62·7	1,005	53·6
2.	Middle	340	22·8	96	23·1	436	22·8	440	23·5
3.	Secondary	226	15·1	51	12·2	277	14·5	429	22·9
4.	Total	1,494	100·0	415	100·0	1,909	100·0	1,874	100·0
5.	Percentage to total	78·3		21·7		100·0			

Source: Figures given in Cols. 2 to 7 have been computed from the data given in : NCERT, *Second All India Educational Survey*, 1966, and those given in Cols. 8 to 9 are taken from: The Ministry of Education, *Selected Educational Statistics*, 1965-66, p. 3.

TABLE 7

Rural-Urban Distribution Pattern of Teaching Manpower according to Section of School Education, 1965

S. No.	*Section*	*Rural*		*Urban*		*All India*	
		No.	*%*	*No.*	*%*	*No.*	*%*
	1	2	3	4	5	6	7
1.	Primary	9,30,770	69·6	2,65,341	46·3	11,96,111	62·7
2.	Middle	2,76,816	20·7	1,59,123	27·8	4,35,939	22·8
3.	Secondary	1,28,916	9·7	1,48,221	25·9	2,77,137	14·5
	Total	13,36,502	100·0	5,72,685	100·0	19,09,187	100·0
	Per cent	70·0		30·0		100·0	

Source: *Second All India Educational Survey*, p. 66.

Urban-Rural Distribution

The rural-urban distribution of stock of teachers has been shown in Table 7. It is seen that 70 per cent of the total stock of teachers is employed in schools located in rural areas. The rural distribution pattern of teachers according to sections of school education is not similar to that of the urban India. In rural India 70 per cent of the total stock is employed in primary sections of school education and it is only 10 per cent of the teachers who were employed in secondary sections. But a different picture is seen from the distribution pattern of teachers employed in urban areas. For example, 46 per cent of teachers were employed in primary sections and a little over half of the total teachers were equally shared between the middle and secondary sections of urban India. It is but natural that the overall distribution pattern as shown in Col. 7 is tilted more favourably towards distribution given under rural India; but the distribution pattern shown under urban India is ultimately going to emerge in rural areas also as school complexes become more developed and expanded. The disparity between the rural and urban distributions of teachers reflects the extent of inequality in the development of overall school facilities in the two sectors of economy.

Teachers per Section

Table 8 shows the rural-urban picture regarding the number of teachers per section according to the three stages of school education. It is seen that in rural areas the number of teachers per section is little more than one-third of the number of teachers per section in urban India. The disparity gets widened as we go down from the secondary section to the primary section. The analysis of data given in the table has to be linked with the disparity in the teacher-pupil ratios in rural and urban sectors as given in the next section.

TABLE 8

Number of Teachers per Section in Primary, Middle and Secondary Stages of Education, 1965

S. No.	*Stage*	*Rural India*	*Urban India*	*All India*
1.	Primary	2·3	5·9	2·6
2.	Middle	3·6	7·6	4·5
3.	Secondary	7·9	13·85	10·3
4.	Total	2·7	7·5	3·3

Source: *Second All India Educational Survey, 1965-66,* p. *65.*

Rural-Urban Differentials: Sub-optimal Utilization

In Table 9, are given the figures of enrolment and teachers according to the three stages of school education. The pupil-teacher ratios have been computed according to rural-urban sectors of the Indian economy. In Col. 11 of the table we have also given pupil-teacher ratios as recommended by the Education Commission for the year 1975-76 for the three stages of education. At the outset, we observe that the pupil-teacher ratios as suggested by the Education Commission and those revealed by the NCERT survey[1] show that the current stock of teachers is not optimally utilized in the entire economy. There are also wide variations in the pupil-teacher ratios for each stage of education in rural and urban areas. On the whole we find that in the rural area, the pupil-teacher ratio was of the order of 35 against 32 in urban India. But the differentials between rural and urban India get reversed for the secondary and middle sections of education. At the primary level we note that the urban pupil-teacher ratio is lower as compared to the rural sector.

State-wise Variations

Appendix 1 gives pupil-teacher ratios for the three sections of school education for each Indian state and Union territory and also according to rural-urban location. Wide variations are quite visible in the pupil-teacher

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[1] Ibid

TABLE 9

Rural-Urban Differences in Pupil-Teacher Ratios, 1965

S. No.	*Stage*	RURAL INDIA			URBAN INDIA			ALL INDIA 1965			*Ratios suggested by Education Commission for 1975-76*
		No. of Teachers (000' s)	*No. of Pupils (000' s)*	*Pupil-Teacher Ratio*	*No. of Teachers (000's)*	*No. of Pupils (000's)*	*Pupil-Teacher Ratio*	*No. of Teachers (000's)*	*No. of Pupils (000's)*	*Pupil-Teacher Ratio*	
	1	2	3	4	5	6	7	8	9	10	11
1.	Primary	931	37,135	40	265	10,106	38	1,196	47,241	39	50
2.	Middle	277	6,396	23	159	4,426	28	436	10,822	25	35
3.	Secondary	129	2,742	21	148	3,486	24	277	6,228	22	25
4.	Total	1,337	46,273	35	572	18,018	32	1,909	64,291	34	

Source: Figures in Cols. 2 to 10 are computed from *Second All India Educational Survey*, 1967, pp. 129-31, 211-15, 299-303 and those given in Col. 11 are taken from Education Commission's Report, *Education and National Development*, p. 480.

raitos as given in the table. These variations have been summarized by working out average ratios from the pupil-teacher ratio given under each level along with their co-efficients of variation (C.V.). From the study of these indices, we note that even if the pupil-teacher ratio in the primary section is low, when we take all urban areas of the Indian states together, the extent of variation is more as compared to rural India. But the direction of the differentials in teacher pupil ratios and C.V.'s gets reversed according to rural-urban location. The extent of the variations can be seen from figures given in Table 10.

TABLE 10

State-wise Variations in Pupil-Teacher Ratios according to Rural and Urban Location, 1965

S. No.	*Stage*	*Technical Coefficient*	*Rural India*	*Urban India*	*All India*
	1	2	3	4	5
1.	Primary	Mean	36·4	32·1	36·1
		C.V.	19·4	38·9	18·0
2.	Middle	Mean	20·3	26·7	22·0
		C.V.	20·3	12·9	20·0
3.	Secondary	Mean	17·1	22·1	19·5
		C.V.	40·9	18·8	36·8

Source: Computed from data given in Appendix 1.

IV

AVERAGE LENGTH OF SCHOOLING AND COST OF REPRODUCTION OF TEACHING SKILLS

Table 11 gives the distribution of teachers according to qualifications. In Col. 2 we have also indicated the number of years assumed as the length of duration for different levels of qualifications, and for each level the cost per pupil year figures are given in Col. 5. It is seen from the table that only 16 per cent of the teachers were with graduate and post-graduate qualifications and that most of them (about three-fourths) were with marticulation or lower qualifications. The average length of schooling per teacher was 10.2 years. *It is indeed disturbing to note that the Indian school system which gives 12 years of education employs teachers whose average education has been less than that.* The cost of reproduction of teaching skills of 19 million school years embodied in the total teaching manpower stock, amounted to Rs. 170 crores and its distribution pattern is given in Col. 7; it shows wide variations as compared to the distribution pattern given in Col. 4. It is also seen from the table that the higher the level of education of teachers the greater is the cost of preparation. Therefore, it is always logical to present the stock of human capital according to cost of its reproduction and on the job experience and also according to the age distribution.

Table 12 gives the average length of schooling of teachers employed in schools with different types of management. Surprisingly, private aided and unaided schools employed teachers with longer duration of schooling as compared to the schools under the local bodies and government control.

TABLE 11

Human Capital Employed in National Education Industry at School Stages of Education, 1965

S. No.	*Level of education*	*Assumed Length of duration*	*No. of teachers (000's)*	*Per-tentage*	*Cost per pupil year *by level*	*Total Investment*	
						Amount (in crores)	*Per-cent-age*
	1	2	3	4	5	6	7
1.	Below Middle pass	6	23	1·2	45	0·62	0·4
2.	Middle passed, but less than Matric	8	652	34·2	107	31·57	18·5
3.	Matric	10	734	38·4	107	51·26	30·1
4.	Intermediate & others	12	197	10·3	320	26·30	15·4
5.	Graduate	14	233	12·2	320	46·15	27·0
6.	Post-graduate	16	70	3·7	350	14·66	8·6
7.	Total		1,909	100·0		170·56	100·0

* In rupees

Source: 1. Number of teachers taken from *Second All-India Educational Survey*, p. 66.

2. Cost per pupil year has been taken from the Report of the Education Commission, *Education and National Development*, p. 478.

TABLE 12

Average Length of Schooling of Teachers According to Type of School Management, 1965

S. No.	*Govt.*	*Local Body*	*Private Aided*	*Private Unaided*	*All Types*
	1	2	3	4	5
1.	10·6	9·3	11·3	11·3	10·2

Source: Computed from Table 11.

The Feedback in the Education Industry

The census of 1961 revealed that the total number of workers with qualifications of matriculation and above was 5.2 million. From *Education in India*[5] (brought out by the Ministry of Education) it is also noted that the number of teachers with qualifications of matric and above was 8 lakhs. The feedback in the education industry is a little over 15 per cent. Therefore, education absorbs one-sixth of the total workers for its own use. This characteristic of a large feedback in its own production of education is to be noted for further planning of education.

Extent of the Untrained Component

The NCERT survey also presented data about the extent of the untrained components of teaching manpower employed in rural and urban India. The percentages of untrained teachers have been computed and given in Table 13. It is seen from the figures of the survey that a little over 26 per cent of teachers were untrained. It is also noted from the table that the percentage of untrained teachers is higher in rural areas than in urban areas. But it is less in case of female teachers as compared to male teachers both in urban and rural areas. It is also seen that 30 per cent of teachers in secondary sections were untrained as against 26 per cent in primary sections and 25 per cent in middle sections. A detailed picture can be seen from the table itself.

Age and Experience of Untrained Teachers

The numbers of teachers according to length of experience and age sectors, are shown in different cells of Table 14. It is seen from the table that 88 per cent of the total untrained teachers were below the age of forty. In fact, teachers with age upto 40 and having experience less than 12 years constitutes 84 per cent of the total untrained teacher stock.

Therefore, in future plans for teacher training programmes, we have to include this young, inexperienced and untained component of teachers.

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[5] *Education in India* (1960-61), Ministry of Education, Government of India.

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TABLE 13

The Extent of Untrained Teachers According to Rural-Urban Location, 1965

S. No.	*Stage*	*Rural India*			*Urban India*			*All India*		
		Men	*Women*	*All persons*	*Men*	*Women*	*All Persons*	*Men*	*Women*	*All Persons*
	1	2	3	4	5	6	7	8	9	10
1.	Primary	27·2	25·3	27·0	25·5	22·6	24·0	27·0	24·0	26·3
2.	Middle	27·3	23·1	26·8	22·4	19·4	21·2	25·9	20·8	24·8
3.	Secondary	37·5	25·4	36·4	26·6	21·4	25·2	32 2	22·3	30·4

Source: Computed from *Second All-India Educational Survey*, pp. 70, 74 & 81

TABLE 14

Untrained Component of Teaching Manpower According to the Stages of Education, Strategic Age and Experience Criteria, 1965

(*Nos. in* 000'*s*)

No.	*Age Sector*	*Primary*			*Middle*			*Secondary*			*All Sectors*		
		Less than 12 *years*	*More than* 12 *years*	*Total*	*Less than* 12 *years*	*More than* 12 *years*	*Total*	*Less than* 12 *years*	*More than* 12 *years*	*Total*	*Less than* 12 *years*	*More than* 12 *years*	*Total*
1.	Below 40 Years	261	15	276	91	5	96	72	3	75	424	23	447
2.	Above 40 Years	11	27	38	4	8	12	3	7	10	18	42	60
	Total	272	42	314	95	13	108	75	10	85	442	65	507

VI

THE METHODOLOGY FOR PROJECTING DEMAND FOR TEACHERS

The Methodology

In projecting the requirements of teaching manpower according to sex, length of experience, education and training and other related characteristics, the following are involved:

a. Detailed information about the distribution of stock of teaching manpower in the base year according to age, rural-urban location, stages of education, sex, length of preparation, length of on-the-job experience, etc.;

b. Information about the distribution of enrolment in the base year according to sex, region, rural-urban location, etc.;

c. Prospective growth in population in the school-going age-groups according to sex and region;

d. Assumptions about the increase in the provision of facilities for the school-going population;

e. Assumptions about the changes in teacher-pupil ratios according to different stages of education; and

f. Assumptions about the prospective rates of wastage in the working stock of teachers on account of withdrawal from working life due to marriage, retirement, death, and other reasons.

The demand generated due to last component, namely *(f)*, will be designated in the paper as teacher requirement due to 'wastage'. Teacher requirements on account of expansion in the educational system and assumed changes in the paper will be designated as demand due to expansion. However, the approach as given here is purely the 'manpower requirement approach'. It suffers from several drawbacks. For example, it does not take into account changes in the internal structure of wage rates of teachers and also does not provide for the changes in the external wage structure of the economy. The manpower estimates are usually single valued and sensitive to changes in the assumptions.

The Data

The population projections in school-going age-groups are taken from the population projections based on medium assumption as given by the Expert Committee on Population Projection. Data about the enrolment and teachers' employment figures by sex and region for the base year were taken from the NCERT's nation-wide *Second All India Education Survey.* The growth pattern of enrolment was examined from the figures given by the Education Commission in its report on *Education and National Development.* Changes in the teacher-pupil ratios were assumed on the basis of figures given in the same report. For working out demand on account of 'wastage' in the stock of teaching manpower a uniform rate of 3 per cent of working teaching manpower in each year was assumed.

Progress in Age-Specific Enrolment Rates, 1950-65.

For projecting the demand for teachers for different stages of school education, it is necessary to review the progress of enrolment in relation to the increase in the population in school-going age-groups. Table 15 gives information on the subject for a period of 15 years, beginning in 1950-51. The figures in brackets are the enrolment rates. These rates have been worked out by expressing enrolment in different classes to the population in corresponding age-groups. It is noted that the total enrolment in 1950-51 was 1.9 crores in Classes I to XII and it increased to 6.4 crores in 1965-66. In terms of age-specific enrolment rates it is noted that there was a wide gap between the enrolment rates for girls and boys. It is gratifying to note that the enrolment rate of girls has increased faster than that of boys. And in case of boys the enrolment rates, particularly in Classes I-IV had touched the mark of 97 per cent in 1965-66. We also know that despite the vigorous attempts made, the girls' enrolment rate was as low as 60 per cent even in 1965-66. Further, the enrolment rate, both for boys and girls in Classes V-VII increased from 13 per cent in 1950-51 to 35 per cent in 1965-66. It is further seen that in Classes VIII to X the enrolment rate increased from 6.5 per cent to 21 per cent during the same period. In Classes XI-XII the enrolment rate increased from 2.2 to a little less than 6 per cent during the period.

Education Commission's Enrolment Basis: An Underestimate

The Education Commission (1964-66) in its report gave estimated figures of enrolment for the year 1965-66, and projected the growth in the size of educational system on that basis. Subsequently, the NCERT Survey revealed that the enrolments as adopted by the Commission were less than the actuals. The two sets of figures have been given in Table 16. Cols. 8 to 10 of the table give the extent of underestimation of enrolment in the base year as given in the Commission's Report. It is seen that the Commission's figures were 12 per cent less than the figures revealed by the NCERT Survey. Particularly, the enrolment in the lower classes, I to IV, was greatly underestimated by the Education Commission; also, the figures for girls' enrolment were more underestimated in all classes as compared to enrolment of boys. This wide gap between the actual and estimated figures may be noted, because for projecting future growth of the educational system, the extent of underestimation has been carried forward by assuming the bigger basis. Therefore, for projecting the growth of the educational system with reference to school stage education, we have assumed that the targets of enrolment rates set for 1986 will be achieved in the year 1981. On the basis of these assumptions, we have worked out enrolment projections which are discussed in the next paragraph.

TABLE 15

Progress in Class-wise Enrolment in Relation to Growth in Corresponding Age-specific Population, 1950-65

(*Figures in 000 's*)

S. No.	*Classes*	1950-51			1955-56			1960-61			1965-66		
		Boys	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*
1		2	3	4	5	6	7	8	9	10	11	12	13
1.	I-IV	10,102 (55 ·0)	3,540 (20 ·1)	13,651 (27 ·8)	12,369 (59 ·5)	5,011 (25 ·0)	17,380 (42 ·6)	17,170 (74 ·0)	7,876 (35 ·0)	24,996 (54 ·8)	27,510 (87 ·0)	16,092 (58 ·6)	43,602 (78 ·1)
2.	V-VII	2,669 (20 ·8)	559 (4 ·0)	3,228 (13 ·0)	3,650 (25 ·6)	933 (6 ·9)	4,592 (16 ·5)	5,887 (35 ·5)	1,876 (12 ·5)	7,463 (24 ·3)	9,121 (49 ·1)	3,632 (20 ·2)	12,753 (34 ·9)
3.	VIII-X	1,304 (10 ·9)	204 (1 ·8)	1,508 (6 ·5)	1,965 (14 ·9)	406 (3 ·3)	2,371 (9 ·3)	2,941 (20 ·4)	741 (5 ·4)	3,682 (13 ·1)	5,228 (31 ·0)	1,651 (10 ·2)	6,882 (20 ·8)
4.	XI-XII	243 (3 ·3)	37 (0 ·5)	282 (1 ·9)	431 (5 ·2)	70 (0 ·9)	502 (3 ·1)	717 (8 ·6)	132 (1 ·6)	849 (4 ·9)	937 (8 ·9)	217 (2 ·2)	1,154 (5 ·6)
5.	I-XII	14,318	4,340	18,669	18,415	6,420	24,845	26,415	10,575	36,990	42,796	21,592	64,391

Note: Figures in the brackets are the enrolment rates.

Source. For 1965-56, figures have been taken from *All-India Educational Survey*, 1965, pp. 129, 211, and 209; and for 1950-51, 1955-56 and 1960-61 from Education Commission : *Education and National Development*, pp. 161, 167.

TABLE 16

Actual and Estimated Enrolment as adopted by the Education Commission, 1965

(*Figures in* 000'*s*)

S. No.	*Classes*	*Actual (NCERT) Survey*			*Estimated Enrolment as adopted by the Education Commission*			*Differences*		
		Boys	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*
	1	2	3	4	5	6	7	8	9	10
1.	I-IV	27,461	16,065	43,526	24,536	12,554	37,090	89·3	78·1	85·2
2.	V-VII	9,110	3,626	12,736	8,962	3,587	12,549	98·4	98·9	98·5
3.	VIII-X	5,223	1,628	6,875	4,617	1,373	5,990	88·4	83·1	87·1
4.	XI-XII	935	217	1,152	695	139	834	74·3	64·1	72 4
5.	I-XII	42,729	21,560	64,289	38,810	17,653	56,463	90·8	81·9	87·8

Source: Figures have been compiled from *Second All India Educational Survey,* 1965, pp. 129, 211 and 299 and *Education and National Development,* p. 100.

Projected Enrolment, 1966-81

We have made it very clear in the preceding paragraph that the enrolment figures adopted by the Education Commission were an underestimate as compared to the NCERT Survey. Therefore, we have taken the NCERT figures as the basis for the growth in enrolment for Classes I to X. For the future target enrolment rates were fixed for Classes I to IV, V to VII, VIII to X for the year 1981. The target rates fixed for enrolment for 1981 were the same as adopted by the Education Commission for the year 1986. The actual enrolment rates for the year 1971 and 1976 were linearly interpolated between actuals of 1966 and targets fixed for 1981 for boys and girls separately and for each state. The state figures were regrouped under four regions. The states covered in the different regions are indicated below.

S. No.	*Region*	*State*
1.	Northern	Jammu and Kashmir, Punjab*, Rajasthan, U.P., H.P., Delhi.
2.	Eastern	Bihar, Orissa, West Bengal, Assam, Manipur, Tripura, Nagaland, NEFA.
3.	Western	Maharashtra, Madhya Pradesh, Gujarat, Goa, Dadra Nagar.
4.	Southern	A.P., Mysore, Madras**, Kerala, Pandichary, Andaman Nicobar Island.

*Now Consists of Haryana and Punjab States

**Now named Tamil Nadu.

The projected enrolment figures for Classes I-IV, V-VII and VIII-X, along with enrolment rates, are given in Tables 17 to 20.

A brief commentary on the growth of enrolment can be made by stating that enrolment in the educational system in Classes I to IV is expected to increase from 4.4 crores in 1966 to 8.0 crores in 1981; for Classes V to VII it is expected to increase from 1.3 crores to 4.7 crores during the same period; and for the Classes VIII to X the enrolment is expected to increase from 0.7 crores in 1966 to 2.0 crores in 1981. In terms of implementation of the directive in Article 45 of the Indian Constitution our projections reveal that it should be possible for the country as a whole and also for different Indian states to cover all children below 14 by the year 1981. Further, the basic assumption involved in our projection is that the inequalities now existing in the enrolment rates for different Indian states will get evened out during next 15 years. This carries, further, a bigger assumption that poorer states have to make bigger sacrifices for allocating more resources for the field of education. Regionwise variations in enrolment rates can be seen from the tables mentioned earlier.

TABLE 17

Actual and Projected Growth in the Enrolment in Classes I-IV, 1965-81

(Figures in 00 '*s*)

S. No. Region	1966			1971			1976			1981		
	Boys	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Northern	77,348 (94·7)	39,500 (53·0)	1,16,848 (74·8)	92,644 (99·6)	63,255 (73·3)	1,55,899 (6·9)	1,07,907 (104·8)	87,466 (91·6)	1,95,373 (98·5)	1,19,064 (110·0)	1,10,220 (110·0)	2,29,284 (110·0)
2. Eastern	64,213 (86·6)	32,018 (43·1)	96,231 (64·8)	81,654 (94·6)	54,335 (86·2)	1,35,989 (86·7)	98,480 (102·3)	81,419 (88·4)	1,79,899 (95·5)	1,13,826 (110·0)	1,08,117 (110·0)	2,21,943 (110·0)
3. Western	61,876 (101·2)	34,956 (58·8)	96,832 (80·3)	74,962 (104·6)	51,119 (76·5)	1,26,081 (91·1)	83,669 (107·3)	68,262 (93·2)	1,51,931 (100·5)	90,886 (110·0)	84,712 (110·0)	1,75,598 (110·0)
4. Southern	71,658 (108·5)	54,446 (83·7)	1,26,104 (96·2)	80,405 (108·9)	63,669 (92·1)	1,44,074 (100·8)	88,118 (109·4)	76,289 (101·0)	1,64,407 (105·4)	91,620 (110·0)	85,262 (110·0)	1,76,882 (110·0)
All-India	2,75,095 (97·2)	1,60,920 (58·9)	4,36,015 (78·4)	3,29,665 (101·5)	2,32,378 (76·3)	5,62,043 (89·3)	3,78,174 (105·7)	3,13,436 (93·27)	6,91,610 (99·7)	4,15,396 (110·0)	3,88,311 (110·0)	8,03,707 (110·0)

Note: Figures in brackets are percentages to relevant age-groups.

TABLE 18

Actual and Projected Growth in Enrolment in Classes V-VII, 1966-81

(*Figures in* 00's)

S. No.	Region	1966			1971			1976			1981		
		Boys	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*
1		2	3	4	5	6	7	8	9	10	11	12	13
1.	Northern	25,968 (49·4)	7,321 (15·0)	33,289 (32·8)	39,795 (62·9)	23,099 (40·0)	62,994 (52·0)	54,846 (76·5)	43,311 (65·2)	98,157 (71·1)	70,542 (90·0)	65,232 (90·0)	1,35,774 (90·0)
2	Eastern	18,497 (37·7)	6,305 (12·9)	24,802 (25·3)	31,766 (55·2)	22,171 (38·8)	53,937 (47·1)	48,433 (72·7)	40,573 (64·4)	89,006 (68·7)	66,149 (90·0)	63,134 (90·0)	1,79,283 (90·0)
3.	Western	21,336 (52·7)	8,523 (21·8)	29,859 (37·5)	30,841 (64·9)	20,322 (44·4)	51,163 (54·8)	42,743 (77·6)	34,416 (67·4)	77,159 (72·7)	53,347 (90·0)	50,016 (90·0)	1,03,363 (90·0)
4.	Southern	25,411 (59·0)	14,173 (33·5)	39,584 (46·3)	35,145 (69·1)	25,658 (52·1)	6,60,803 (60·8)	45,000 (79·52)	37,312 (71·1)	82,312 (75·5)	54,784 (90·0)	51,087 (90·0)	1,05,871 (90·0)
	All-India	91,212 (49·2)	36,322 (20·3)	1,27,534 (35·0)	1,37,547 (62·8)	91,250 (43·5)	2,28,797 (53·3)	1,91,022 (76·4)	1,55,612 (66·8)	3,46,634 (71·8)	2,44,822 (90·0)	2,29,489 (90·0)	4,74,291 (90·0)

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TABLE 19

Actual and Projected Enrolment in Class I-VII By Sex, 1966-81

S. No. Region	1966 (*Base Year*)			1971			1976			1981		
	Boys	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Northern	1,03,316 (77·0)	46,821 (37·9)	1,50,137 (58·3)	1,32,439 (84·7)	86,354 (59·9)	2,18,793 (72·8)	1,62,753 (93·2)	1,30,777 (80·8)	2,93,530 (87·2)	1,89,606 (101·6)	1,75,452 (101·6)	3,65,058 (101·6)
2. Eastern	82,710 (67·1)	38,323 (31·1)	1,21,033 (49·1)	1,13,420 (78·9)	76,506 (54·9)	1,89,926 (67·1)	1,46,913 (90·2)	1,21,992 (78·7)	2,68,905 (84·6)	1,79,975 (101·7)	1,71,251 (101·7)	3,51,226 (101·7)
3. Western	83,212 (81·9)	43,479 (44·2)	1,26,691 (63·3)	1,05,803 (88·8)	71,441 (63·5)	1,77,244 (76·5)	1,26,412 (95·0)	1,02,678 (82·6)	2,29,090 (89·0)	1,44,233 (101·6)	1,34,728 (101·6)	2,78,961 (101·6)
4. Southern	97,069 (88·9)	68,619 (63·9)	1,65,688 (76·5)	1,15,550 (92·7)	89,527 (75·5)	2,04,877 (84·3)	1,33,118 (97·1)	1,13,801 (88·8)	2,46,719 (93·1)	1,46,404 (101·5)	1,36,349 (101·5)	2,82,753 (101·5)
All-India	3,66,307 (78·2)	1,97,242 (43·6)	5,63,549 (61·2)	4,67,212 (83·9)	3,23,628 (62·9)	7,90,840 (74·7)	5,69,196 (93·7)	4,69,048 (82·4)	10,38,244 (88·2)	6,60,218 (101·6)	6,17,780 (101·6)	12,77,998 (101·6)

TABLE 2

Actual and Projected Growth in Enrolment by Sex in Relation to Changes in Age-Specific Population for Classes VIII-X, 1966-81.

(*Figures in 00's*)

S. No.	Region	1966			1971			1976			1981		
		Boys	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*	*Boys*	*Girls*	*Boys and Girls*
	1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Northern	14,849 (31·1)	3,263 (7·4)	18,112 (19·7)	21,851 (38·4)	6,832 (13·1)	28,683 (26·3)	30,403 (45·8)	11,654 (19·1)	42,057 (33·0)	39,558 (53·1)	17,120 (24·9)	56,678 (39·5)
2.	Eastern	10,694 (24·1)	2,569 (5·9)	13,263 (15·1)	17,636 (34·0)	6,328 (12·2)	23,964 (23·1)	26,114 (42·9)	10,789 (18·4)	36,903 (30·9)	35,667 (51·7)	16,130 (24·5)	51,797 (38·4)
3.	Western	11,805 (32·4)	3,718 (10·7)	15,523 (21·8)	16,738 (39·1)	6,450 (15·5)	23,188 (27·5)	23,442 (46·3)	9,810 (20·6)	33,252 (33·9)	30,135 (53·4)	13,517 (25·6)	43,652 (40·0)
4.	Southern	14,931 (37·7)	6,989 (17·9)	21,920 (27·9)	20,000 (43·4)	9,507 (20·9)	29,507 (32·24)	25,876 (49·0)	12,057 (24·2)	37,933 (37·0)	3,1931 (54·7)	14,909 (27·4)	46,840 (41·5)
	All-India	52,279 (31·1)	16,539 (10·2)	68,818 (20·9)	76,225 (38·6)	29,117 (15·2)	1,05,342 (27·1)	1,05,835 (45·9)	44,310 (20·4)	1,50,145 (33·5)	1,37,291 (53·1)	61,676 (25·5)	1,98,967 (39·8)

Teacher-pupil Ratio: Growth in Stock of Teachers

For working out growth in the size of stock of teachers for different levels of education, we have to make assumptions about the changes in pupil-teacher ratios for different stages of education. In this connection, we have assumed pupil-teacher ratios as suggested by the Education Commission in its report (p. 480). It may be necessary to mention here that for the year 1976, we have assumed pupil-teacher ratios as recommended in the Commission's Report but for 1981 we have assumed for Classes I-IV the teacher-pupil ratio recommended for the year 1985-86. For Classes V to VII we have assumed the pupil-teacher ratio to be 30, and for Classes VII to X, we have used same pupil-teacher ratio as recommended by the Commission. The pupil-teacher ratios assumed for the projection purposes are given in Table 21.

The growth in the stock of teachers has been worked out by applying the pupil-teacher ratios given in Table 21 to the projected enrolment figures given earlier. The results are given in Table 22. It reveals that the stock of teachers in Classes I to X is expected to increase from 1.9 millions to 4.2 millions in 1981. It shows that the employment of teachers has to be planned carefully and advance action has to be taken for creation of chairs, identification, recruitment and placement of teachers in different parts of the country. The story does not end here. The figures in Table 22 only give an idea about the creation of positions for teachers in different states of the economy. So far as total training programmes and preparation of teachers is concerned, we have also to provide for normal replacement (i.e. 'wastage') of teachers.

Total Demand for Teachers

The total demand for teachers has been given in Table 23. It provides for the expansion, as well as wastage components of the demand during the next 15 years.

It is seen from the figures that the additional demand during the next 15 years will be of the order of 8.5 lakhs for 1966-71; 9.1 lakhs in 1971-76; and 16.3 lakhs for the years 1976-81. The total demand for teaching manpower generated during the next 15 years will be of the order of 3.4 million. Of this 1.1 million or one-third is due to replacement needs of the teaching manpower. The remaining two-thirds is on account of expansion in the educational system during the period.

TABLE 21

Changes in Pupil-Teacher Ratio According to the Stages of Education, 1966-81

S. No.	Region	*Primary (I-IV)*				*Middle (V-VII)*				*Secondary (VIII-X)*			
		1966 (*Actual*)	1971	1976	1981	1966 (*Actual*)	1971	1976	1981	1966 (*Actual*)	1971	1976	1981
	1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Northern	44	45	50	45	31	30	35	30	23	25	25	25
2.	Eastern	35	45	50	45	27	30	35	30	21	25	25	25
3.	Western	40	45	50	45	26	30	35	30	24	25	25	25
4.	Southern	39	45	50	45	27	30	35	30	24	25	25	25
	All-India	39	45	50	45	28	30	35	30	23	25	25	25

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TABLE 22

Actual and Projected Growth in Region-wise Stock of Teaching Manpower, 1966-81

S. No.	*Region*	1966				1971			
		Primary	*Middle*	*Secondary*	*Total*	*Primary*	*Middle*	*Secondary*	*Total*
	1	2	3	4	5	6	7	8	9
1.	Northern	2,63,456	1,06,691	79,223	4,49,370	3,46,439	2,09,644	1,14,732	6,70,815
2.	Eastern	2,75,119	93,179	62,057	4,30,355	3,02,197	1,79,788	95,857	5,77,842
3.	Western	2,42,865	1,13,450	65,172	4,21,487	2,80,177	1,70,541	92,751	5,43,469
4.	Southern	3,21,296	1,46,776	90,989	5,59,061	3,20,162	2,02,671	1,18,027	6,40,860
	All-India	11,02,736	4,60,096	2,97,441	18,60,273	12,48,975	7,62,644	4,21,367	24,32,986

TABLE 22 (contd.)

Actual and Projected Growth in Region-wise Stock of Teaching Manpower, 1966-81

S. No.	Region	1976				1981			
		Primary	*Middle*	*Secondary*	*Total*	*Primary*	*Middle*	*Secondary*	*Total*
		10	11	12	13	14	15	16	17
1.	Northern	3,90,746	2,80,445	1,68,228	8,39,419	5,09,514	4,52,575	2,26,712	11,88,801
2.	Eastern	3,59,798	2,54,300	1,47,610	7,61,708	4,93,202	4,30,939	2,07,189	11,31,330
3.	Western	3,03,863	2,20,452	1,33,006	6,57,321	3,90,213	3,34,541	1,74,608	9,09,362
4.	Southern	3,28,814	2,35,173	1,51,728	7,15,715	3,93,067	3,52,901	1,87,359	9,33,3 7
	All-India	13,83,221	9,90,370	6,00,572	29,74,163	17,85,996	15,80,956	7,95,868	41,62,820

LIMITATIONS

Two important limitations, regarding the growth in the demand for teaching manpower may be noted. First, the assumption that the constitutional directive of implementing Article 45 by 1981 seems quite optimistic. It is clear from the current thinking of the Planning Commission and the decisions take by the Steering Committee of the Planning Group on Education, that the provision of universal education for all children up to the age of 14 years would be achieved, at the latest by 1991, and the provision of universal education for all children in the age-group 6-11 should be completed in 1981. This will be done by opening new schools in smaller habitations, by encouraging enrolment of girls and children of backward communities and by progressively eliminating stagnation. To the extent that school facilities are not expanded at the rate envisaged by us, the teacher requirement is an overestimate. The second limitation of our estimate is high pupil-teacher ratios, assumed during 1966-76. Sometimes we have assumed higher teacher-pupil ratios, as compared to those assumed by the Education Commission. Further, we have assumed an increasing trend in the pupil-teacher ratio, during the period under investigation. This involves an assumption that the states, where the teacher-pupil ratio is low, will finally converge to the national average, and also that those states, where the pupil-teacher ratio is higher will make efforts in lowering it. This may not happen in practice. Therefore, our estimates of the demand for teachers is an underestimate. One more point bears on the replacement needs for teaching manpower. We have assumed a rate of 3 per cent annual attrition in stock of teaching manpower; this again is an overestimate. The combined effect of the three factors on future growth in the demand for teaching manpower is not very clear at this stage. In short, the present exercise gives an idea about the growing demand for teachers and the corresponding facilities to be provided for their training and preparations for removing regional and state inequalities in their distribution pattern. This creates a need for regional planning for teaching manpower and also for standardization of the salary-structure of the teaching profession between different states and as compared to similar professions in other sectors of the economy. This may further point out a need for creating regional or national programmes for teacher training at elementary and secondary levels.

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TABLE 23

Aggregated Additional Demand for Teaching Manpower, 1966-81

S. No	Region	1966-71			1971-76			1976-81		
		Growth	*Wastage*	*Total*	*Growth*	*Wastage*	*Total*	*Growth*	*Wastage*	*Total*
1.	Northern	2,21,445	67,406	2,88,851	1,68,604	1,00,622	2,69,226	3,49,382	1,25,913	4,75,295
2.	Eastern	1,47,387	64,553	2,12,040	1,83,866	86,678	2,70,544	1,69,622	1,14,257	4,33,879
3.	Western	1,21,982	63,225	1,85,207	1,13,852	81,521	1,95,375	2,52,041	98,600	3,50,641
4.	Southern	81,799	83,859	1,65,658	74,855	96,131	1,70,986	2,17,612	1,07,359	3,24,971
	All-India	5.72,713	2,79,043	8,51,756	5,41,177	3,64,952	9,06,129	11,88,657	4,46,129	16,34,786

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APPENDICES

APPENDIX 1

State-wise Variation in Pupil-Teacher Ratios, 1965

STATE	PRIMARY			MIDDLE			SECONDARY		
	RURAL INDIA	URBAN INDIA	ALL INDIA	RURAL INDIA	URBAN INDIA	ALL INDIA	RURAL INDIA	URBAN INDIA	ALL INDIA
1	2	3	4	5	6	7	8	9	10
Andhra Pradesh	40	39	40	21	25	22	16	21	18
Assam	39	39	39	20	27	21	21	21	21
Bihar	37	35	36	22	26	23	26	28	27
Gujarat	44	42	44	24	30	27	23	27	25
Jammu & Kashmir	28	38	30	14	21	17	14	19	16
Kerala	40	41	40	26	27	26	27	26	27
Madhya Pradesh	33	37	34	18	26	21	19	21	21
Madras	36	37	36	21	27	24	19	24	22
Maharashtra	43	39	42	24	30	27	22	26	24
Mysore	44	42	44	25	30	27	25	29	28
Orissa	35	36	35	17	25	18	19	21	20
Punjab	44	41	45	24	33	28	17	23	20
Rajasthan	34	32	34	21	25	22	15	20	18
Uttar Pradesh	52	39	49	27	30	28	22	24	23
West Bengal	34	35	34	26	30	28	14	16	15
Dadra Nagar Haveli	39	—	39	16	—	16	22	—	22
Delhi	—	33	33	—	21	21	—	18	18
Goa, Daman, Diu	34	35	34	20	25	22	18	23	21
Himachal Pradesh	25	33	25	14	24	15	13	15	14
L.M. & A. Island	25	—	25	13	—	13	11	—	11
Manipur	22	29	22	19	33	21	21	27	23
Pondicherry	40	35	39	20	24	22	17	20	18
Tripura	33	30	32	15	22	17	10	14	12
All India	40	38	39	23	28	25	21	24	22

Source: *Second All India Educational Survey,* pp. 129-33, 211-15 and 299-313

APPENDIX 2

Additional Regional Demand for Teachers on Account of Expansion in Facilities and Wastage in the Stock, 1965-81

1966 - 71

S. No. Region	Primary			Middle			Secondary		
	Growth	*Wastage*	*Total*	*Growth*	*Wastage*	*Total*	*Growth*	*Wastage*	*Total*
1	2	3	4	5	6	7	8	9	10
1. Northern	82,983	39,519	1,22,502	1,02,953	16,003	1,18,956	35,509	11,884	47,393
2. Eastern	27,078	41,268	68,346	86,609	13,977	1,00,586	33,800	9,308	43,108
3. Western	37,312	36,430	73,742	57,091	17,019	74,110	27,579	9,776	37,355
4. Southern	1,134	48,193	47,059	55,895	22,017	77,912	27,038	13,649	40,687
All-India	1,46,239	1,65,410	3,11,649	3,02,548	69,016	37,1,564	1,23,926	44,617	1,68,543

1971 - 76

1	11	12	13	14	15	16	17	18	19
1. Northern	44,307	51,965	96,272	70,801	31,447	1,02,248	53,496	17,210	70,706
2. Eastern	57,601	45,330	1,02,931	74,512	26,969	1,01,481	51,753	14,379	66,132
3. Western	23,686	42,026	65,712	49,911	25,582	75,493	40,255	13,913	54,168
4. Southern	8,652	48,027	56,679	32,502	30,400	62,902	33,701	17,704	51,405
All-India	1,34,246	1,87,348	3,21,594	2,27,726	1,14,398	3,42,124	1,79,205	63,206	2,42,411

1976-81

1	20	21	22	23	24	25	26	27	28
1. Northern	1,18,768	58,611	1,77,379	1,72,130	42,068	2,14,198	58,484	25,234	83,718
2. Eastern	1,33,404	53,970	1,87,374	1,76,639	38,146	2,14,785	59,759	22,141	81,720
3. Western	86,350	45,580	1,31,930	1,24,089	33,069	1,57,158	41,602	19,951	61,553
4. Southern	64,253	49,324	1,13,577	1,17,728	35,276	1,53,004	35,631	22,759	58,390
All-India	4,02,775	2,07,485	6,10,260	5,90,586	1,48,559	7,39,145	1,95,296	9,0085	2,85,381

APPENDIX 3

Actual and Projected Growth in the Stock of Teaching Manpower in Indian States, 1965-81

S. No.	State	1966 (Actual)				1971			
		Primary	Middle	Secondary	Total	Primary	Middle	Secondary	Total
	1	2	3	4	5	6	7	8	9
1.	J & K.	7,568	4,350	3,450	15,368	7,775	4,927	2,992	15,694
2.	Punjab	44,780	23,775	17,539	86,094	66,070	41,573	22,324	1,30,067
3.	Rajasthan	44,014	16,380	10,654	71,048	51,720	32,653	16,332	1,00,705
4.	Uttar Pradesh	1,51,872	52,035	39,499	2,43,406	2,05,905	1,19,825	65,816	3,91,546
5.	Himachal Pradesh	3,749	2,345	1,506	8,655	3,749	2,233	1,172	7,154
6.	Delhi	10,418	7,806	6,575	24,799	11,220	8,433	5,996	25,649
	Northern Region	2,63,456	1,06,691	79,223	4,49,370	3,46,439	2,09,644	1,14,732	6,70,815
1.	Bihar	85,001	29,176	17,263	1,31,440	1,05,026	65,656	35,144	2,05,826
2.	Orissa	45,959	15,701	6,688	68,348	48,380	25,507	12,924	86,811
3.	West Bengal	1,01,441	31,238	26,236	1,58,915	1,02,557	61,519	32,816	1,96,892
4.	Assam	30,807	12,972	9,223	53,002	37,260	22,023	12,176	71,459
5.	Manipur	5,987	1,774	1,068	8,829	3,611	1,950	1,248	6,809
6.	Tripura	3,319	1,466	1,466	5,931	3,491	2,083	1,060	6,634
7.	Nagaland	2,148	699	308	3,155	1,316	693	336	2,345
8.	NEFA	457	153	125	735	556	357	153	1,066
	Eastern Region	2,75,119	93,179	62,057	4,30,355	3,02,197	1,79,788	95,857	5,77,842

S. No.	State	1976							
		Primary	*Middle*	*Secondary*	*Total*	*Primary*	*Middle*	*Secondary*	*Total*
	1	10	11	12	13	14	15	16	17
1.	Jammu & Kashmir	8,792	6,766	4,188	19,746	11,464	10,200	5,320	26,984
2.	Punjab	75,128	57,048	33,492	1,65,668	1,00,099	87,959	45,104	2,33,162
3.	Rajasthan	64,614	47,896	26,856	1,39,366	91,421	80,729	38,748	2,10,898
4.	Uttar Pradesh	2,25,264	1,55,232	94,096	4,74,592	2,85,362	2,54,097	1,25,768	6,65,227
5.	Himachal Pradesh	4,038	2,986	1,712	8,736	3,862	4,440	2,240	10,542
6.	Delhi	12,910	10,517	7,884	31,311	17,306	15,150	9,532	41,988
	Northern Region	3,90,746	2,80,445	1,68,228	8,39,419	5,09,514	4,52,575	2,26,712	11,88,801
1.	Bihar	1,33,580	96,367	55,220	2,85,167	1,92,254	1,68,448	79,188	4,39,890
2.	Orissa	53,368	36,577	20,656	1,10,601	67,148	60,059	29,104	1,56,311
3.	West Bengal	1,17,654	83,404	49,316	2,50,374	1,57,396	1,37,429	67,520	3,62,345
4.	Assam	45,050	31,131	18,320	94,501	63,033	53,723	25,852	1,42,608
5.	Manipur	3,860	2,509	1,680	8,049	4,840	4,110	2,168	11,118
6.	Tripura	4,250	2,880	1,632	8,762	5,940	4,830	2,252	13,022
7.	Nagaland	1,224	826	476	2,526	1,344	1,230	612	3,186
8.	NEFA	812	606	310	1,728	1,247	1,110	493	2,850
	Eastern Region	3,59,798	2,54,300	1,47,610	7,61,708	4,53,202	4,30,939	2,07.189	11,31,330

APPENDIX 3 (*Contd.*)

Actual and Projected Growth in the Stock of Teaching Manpower in Indian States, 1965-81

S. No.	*State*	1966				1971			
		Primary	*Middle*	*Secondary*	*Total*	*Primary*	*Middle*	*Secondary*	*Total*
	1	2	3	4	5	6	7	8	9
1.	Maharashtra	1,10,728	57,424	32,875	2,01,027	1,29,843	77,826	43,368	2,51,037
2.	Madhya Pradesh	75,452	27,972	16,378	1,19,802	79,313	52,063	26,660	1,58,036
3.	Gujarat	54,072	26,973	15,317	96,362	68,890	38,570	22,104	1,30,564
4.	Goa	2,491	1,038	588	4,117	1,973	1,010	583	3,571
5.	Dadra Nagar Haveli	122	43	14	179	158	72	31	261
	Western Region	2,42,865	1,13,450	6,5,172	4,21,487	2,80,177	1,70,541	92,751	5,43,469
1.	Andhra Pradesh	84,272	30,466	20,835	1,35,573	93,344	54,236	27,572	1,75,152
2.	Mysore	64,889	26,955	15,837	1,07,681	72,604	43,340	25,640	1,41,584
3.	Madras	1,07,935	49,276	30,665	1,87,876	91,317	62,669	36,460	1,90,446
4.	Kerala	62,730	39,385	23,179	1,25,294	61,602	41,580	27,884	1,31,066
5.	Pondicherry	1,061	537	390	1,988	993	683	306	2,072
6.	Andaman Nicobar Island	269	83	47	399	217	118	53	388
7.	L.M. & A. Islands	140	74	36	250	85	45	22	152
	Southern Region	3,21,296	1,46,779	90,989	5,59,061	3,20,162	2,02,671	1,18,027	6,40,860

APPENDIX 3 (*Contd.*)

Actual and Projected Growth in the Stock of Teaching Manpower in Indian States, 1965-81

S. No.	*State*	1 9 7 6				1 9 8 1			
		Primary	*Middle*	*Secondary*	*Total*	*Primary*	*Middle*	*Secondary*	*Total*
	1	10	11	12	13	14	15	16	17
1.	Andhra Pradesh	1,01,418	71,882	41,588	2,14,888	1,28,161	1,14,929	56,720	2,99,810
2.	Mysore	76,674	52,659	34,152	1,63,485	94,281	83,549	43,224	2,21,054
3.	Madras	89,870	65,288	43,344	1,98,502	1,01,859	92,819	50,992	2,45,670
4.	Kerala	59,504	44,417	32,036	1,35,957	67,148	60,209	35,688	1,63,045
5.	Pondicherry	1,018	714	488	2,220	1,198	1,050	560	2,808
6.	Andaman Nicobar Island	252	161	91	504	335	270	137	742
7.	L. M. & A. Islands	78	52	29	159	85	75	38	198
	Southern Region	3,28,814	2,35,173	1,51,728	7,15,715	3,93,067	3,52,901	1,87,359	9,33,327
1.	Maharashtra	1,32,100	96,759	59,696	2,88,555	1,60,843	1,42,799	75,284	3,78,926
2.	Madhya Pradesh	96,444	69,585	40,700	2,06,729	1,34,296	1,17,959	56,504	3,08,759
3.	Gujarat	73,442	52,839	31,812	1,58,093	93,035	81,959	41,872	2,16,866
4.	Goa	1,690	1,151	740	3,581	1,784	1,620	360	4,264
5.	Dadra Nagar Haveli	187	118	58	363	255	204	88	547
	Western Region	3,03,863	2,20,452	1,33,006	6,57,321	3,90,213	3,44,541	1,74,608	9,09,362

Falling Educational Standards[1] — An Analysis

Raj Narain

This paper discusses a study undertaken to make a conceptual analysis of falling educational standards in present-day Indian education. The method used was an 'experience survey' and perceptions of 'falling educational standards' were collected from the press, examiners' reports, interviews with teachers, educators and correspondence with educationists in other countries. The material collected was subjected to content-analysis and areas in the educational set-up, which affect standards, analysed.

The Problem

The problem of educational standards has attracted the attention of all and sundry in India today. Statements on educational standards have been made every now and then by state dignitaries like the President, the Vice-President, the Prime Minister; policy-makers in education like state and central ministers of education; administrators like education secretaries, directors of public instruction, inspectors of schools, principals, headmasters and headmistresses, teachers of all grades; examiners of universities, boards of education, and public service commissions, parents and employers; and leaders of public opinion like journalists, editors, and legislators.

A vast majority of those who have expressed themselves on this problem aver that educational standards have fallen and are going down, and that the fall characterizes all the stages of education—primary, secondary and higher. A few however perceive the fall as occurring only in selected areas, aspects or stages of education. Typical remarks about this fall include:

> . . . while the average quality in honours classes might have gone down, today's best is better than yesterday's best.

> . . . our undergraduate standards are somewhat depressed, but our post-graduate and research standards have improved and show signs of further improvement.

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[1] Based on the report of the project entitled "A Conceptual Analysis of *Falling Educational Standards*" sponsored by the National Council of Educational Research and Training, New Delhi.

> . . . whatever lowering of standard has occurred, it is more on the moral plane than any other.
>
> . . . no fear that standards of technical education are falling.

There are occasional voices contending that standards have not fallen; on the contrary they are rising. But on the whole the indictments on present-day educational standards far outweigh its defence.

In view of the widely held belief that educational standards are falling, an enquiry into the veracity of the belief has become necessary. For, if the belief is true, it constitutes a sad commentary on the post-independence development of education in this country, a condemnation of the policies pursued by the Government—both at the Centre and in the States, and a challenge to the University Grants Commission which is charged with maintaining standards of university education. No popular government can afford to ignore an anxiety shared by a vast majority of its subjects even though there may be no legitimate grounds for it. Any attempt to ignore the problem by characterizing it as a corollary of the transitional phase we are in will be interpreted as sophistry on the part of the powers that be. The enquiry is also indicated because the phenomenon of falling educational standards seems to be unique to this country; educationists elsewhere are rather unaware of it in their own lands. The enquiry may also be undertaken to initiate the practice, followed for instance in Great Britain, of some form of national evaluation at regular intervals. Such periodical testing serves a double purpose: if it reveals success it allays natural anxieties; if otherwise it enables directing authorities to assess the effectiveness of measures that might have been taken affecting the basic subjects.

Previous Work

In 1961 the University Grants Commission appointed a committee to make a systematic and objective assessment of standards of university education and suggest measures for improvement. The Committee came to the conclusion that while the quality of the best students was as good as ever, the average product of an Indian University did not compare favourably with his counterpart in some of the well-known world universities. The enormous expansion of education, the Committee held, has 'diluted' facilities to such an extent that special attention did not seem to be paid to develop the personality of students. The Committee admitted that the quality of education depended on the quality of teachers. (University Grants Commission, 1965.)

In 1964 *The Education Quarterly* organized a symposium on "Are our educational standards falling?" The participants observed that the term 'standard' was capable of a variety of interpretations: it might refer to achievements in public examinations, degree of physical fitness, level of moral integrity, intensity of faith in moral values of life, quality of gentlemanliness, and the like. Standards were held to be relative to the needs and conditions of a given age and therefore to be reviewed from time to time. Three of the participants (Hiren Mukerji, M. N. Kapur and Samuel Mathai) were not ready to accept any fall in standards at the post-graduate level although they admitted that the fall was sometimes witnessed at the first degree level. Prem Kirpal contended that poor results in examinations, specially in English, were not a new phenomenon in secondary education. Bhattacharya, referred to retrogression, particularly in teacher education; but S. C. Sen countered that standards of technical education were not falling. P. C. Goswami submitted that the fall was of our own making arising from overloaded curricula, unplanned school routine, bad textbooks, inadequate methods of teaching, lack of library facilities, defective examination system, unenthusiastic inspectors and administrators, and stereotypy in teacher education. (Mukerji and others, 1964.)

In 1965 the National Council of Educational Research and Training in their "Opinion about Standards" reported that interviews with parents, school teachers, heads of institutions, educational administrators and journalists showed that the respondents were "fairly satisfied" with the present state of secondary school work, taking 'standard' to mean achievement and development of understanding; and that they held the poor quality of teachers to be responsible for the unsatisfactory state of education (Mehta, 1965.)

In the same year a symposium for "Evaluation of Our Educational Standards" was held at Baroda. It was suggested at the symposium (Baroda, 1965) that the criteria of educational standards may be fulfilment of instructional objectives, examination results, language skills, social efficiency and job success. William M. Cave allied educational standards with the dominant values of a society; for, according to him, institutional goals cannot be preceived in isolation from the social system of a democratic country; hence the study of educational standards in any country has to be undertaken in relation to the needs of society.

Present Study

The present study assumed that a fairly clear concept of 'standards' in education is the *sine qua non* for any attempt to measure or assess standards or to modify them. Hence the study was directed to the discovery of the constituents of the concept of 'standards', which will apply to any type, level, stage of education. But the study was more concerned about the secondary stage of education than about stages above or below that. The term 'falling' has no bearing on the present analysis except that it clarifies the concept 'standards'.

A concept is clarified by analyzing it; and to analyze a concept is, as G. E. Moore explains, to mention explicitly all the constituents implicit in it. This type of analysis has however certain limitations, to remedy which the followers of early Wittgenstein and the Logical Positivists have proposed the 'New level' analysis. The latter consists in finding **out the** methods and ways of verifying statements with experiences. Both the forms of analysis are of major importance for a proper grasp of knowledge that has already been acquired. Analysis cannot however do everything. When concepts have been clarified it can be decided only by experience whether they apply to things. The formulation of proper questions and the decision about the truth or falsity of theories is a result of both analysis *and* experience.

Method

The present study utilized the method of 'experience survey'. It collected perceptions of people on 'falling educational standards'. The perceptions were considered to be products of their experiences *ante* to their responses or reports given in the survey.

Four different sources to reach the experiences of people were tapped in the study: the press; the reports examiners; interviews with teachers, educators and parents: and correspondence with foreign educationists. *The National Herald* was chosen to represent the press. Its daily issues from July 1962 to March 1966 were scanned for references to 'educational standards'. The reports of examiners studied were those published by the Public Service Commission, U.P. for their Combined State Services Examinations of 1960 and 1962. Interviews on the basis of a structured schedule were conducted with 76 respondents at Lucknow and 50 in Madras State; the interviewees included parents, teachers, headmasters, principals, educational administrators, legislators and journalists. Fifty educationists in fourteen different countries were requested to communicate their views about educational standards through filling up a semi-structured questionnaire; 16 of them, belonging to eight countries, did return the questionnaire answered.

The material obtained from the press, examiners' reports and interviews, and through correspondence, was subjected to the technique of 'content analysis'. The categories of 'Criteria', 'Causes', and 'Consequences' were found appropriate for analysis. Content units relevant to educational standards were called 'Indicators' and each indicator was put under the category suited to it according to the judgment of the coder who classified the responses or reports.

Are standards falling?

The perceptions of people regarding 'falling educational standards' can be classified into: (1) Spontaneous, deliberate references, (2) non-spontaneous deliberate references, (3) spontaneous, non-deliberate references, and (4) non-spontaneous, non-deliberate references to the object of enquiry. Press cuttings give us (1) and (3); examiners' reports and correspondence give us (2); and interviews provide us with (4).

An analysis of the non-spontaneous, deliberate and non-deliberate responses to the question "Are standards falling?" yielded the results shown in Table 1.

TABLE 1

Analysis of Responses To "Are Standards Falling"

Source	*Are standards falling?*				Standards are rising	No reference	No answer	Total
	Unqualified		*Qualified*					
	Yes	*No*	*Yes*	*No*				
Correspondence	X	2	1	1	8	2	2	16
Lucknow Interviews	72	2	1	X	X	1	X	76
Madras Interviews	28	14	4	4	X	X	X	50
Total	100	18	6	5	8	3	2	142

Combining the qualified and unqualified 'Yes' and 'No' categories of Table 1 and ignoring the 'No reference' and 'No answer' categories, we obtain from Table 1, the results shown in Table 2.

TABLE 2

Simplified Analysis of Responses to "Are Standards Falling"

Source	*Yes*	*No*	*Total*
Correspondence (foreign)	1	11	12
Lucknow Interviews	73	2	75
Madras Interviews	32	18	50
Total	106	31	137

Applying appropriate statistical tests (chi-square/Fisher's Exact probability) to the data of Table 2, we find that the verdict of foreign educationists was a 'No Fall' in standards ($p < .01$); the Lucknow verdict was, of course, a 'Fall' in standards, whereas the verdict in Madras State tended to point out a 'No Fall' but it was not significant ($.05 \quad p < .06$). But the overall verdict in India accepted 'Fall' in standards as significant ($p < .01$). In view of this an analysis of the factors in the educational set-up responsible for the 'Fall' was called for.

Factors in Educational Set-up responsible for 'Fall'

Content analysis of the material collected from the press, examiners' reports, correspondence, and interviews revealed 16 broad areas in the educational set-up which are said to affect standards. Table 3 shows details of the analysis.

TABLE 3

Analysis of factors in Educational Set-up Affecting 'Fall'

Area	*Falling Standards*				*Indicators repeated in more than one category*	
	*Indicators**			*Significance level (observed Cr. & Co. only)***		
	Cr.	*Ca.*	*Co.*		*Cr. & Ca.*	*Cr. & Co*
1 Quality of students	108	26	11	$p<\cdot01$	7	3
2. Deterioration in Educational Life	67	5	5	$p<\cdot01$	..	3
3. Wastage	8	0	0	$p<\cdot01$	..	..
4. Quality of Teachers	32	38	1	$p<\cdot70$	7	..
5. Defects in Curriculum	20	31	1	$p<\cdot20$	1	..
6. Social Distractions	1	10	1	$p<\cdot02$	..	..
7. Defects in Society	4	11	3	$p<\cdot20$	..	..
8. Politics in Education	3	8	0	$p<\cdot30$	2	..
9. Expansion of Education	5	22	0	$p<\cdot01$	5	..
10. Defects in the Educational System	16	57	0	$p<\cdot01$	2	..
11. Defects in Organisation	2	17	0	$p<\cdot01$	..	..
12. Maladministration	1	16	0	$p<\cdot01$	..	..
13. Defects in Examination System	9	33	0	$p<\cdot01$	3	..
14. Quality of Educational Institutions	27	62	0	$p<\cdot01$	12	..
15. Quality of Textbooks	5	25	0	$p<\cdot01$	1	..
16. Home Conditions of Students	2	13	0	$p<\cdot01$	1	..
Total	310	374	22		42	6

*Indicators: Cr. — Criteria; Ca. — Causes: Co. — Consequences

**Assumption: Equal probabilities between Cr. and Ca. ignoring Co. (using chi-square, Fisher's Exact Probabilities Tests).

Table 3 shows that three areas in the educational set-up contain significantly ($p < .01$) more indicators under 'Criteria'. They are: Quality of Students, Deterioration in Educational Life, and Wastage. Table 4 lists the indicators under these three areas and also shows the frequency of responses under each indicator.

TABLE 4

Indicators, with their frequency, of three selected areas

Area	*Indicator*	*Frequency*
Quality of Students	Lack of knowledge in students	56
	„ „ in English	14
	„ „ in Mathematics	8
	Poor expression in language	39
	„ „ in English	10
	Poor vocabulary	11
	Poor expression through written form	11
	Deficiencies in language	6
	Poor general knowledge	15
	Grammatical mistakes in languages	26
	Spelling mistakes in languages	19
	Inability to grasp subject-matter properly	12
	Poor memory	6
	Poor achievement	15
	Poor standard of answering questions	40
	Poor performance in examinations	42
	(116 other indicators with frequencies of 5 and below)	
Deterioration in Educational Life	Fall in the application of knowledge	88
	„ the acquisition of knowledge	81
	„ depth of knowledge	107
	„ breadth of knowledge	34
	„ elementary education (standard)	30
	„ secondary education „	63
	„ university education „	9
	„ all stages of education „	40
	Deterioration in the knowledge of English	91
	„ „ „ „ Mathematics	33
	„ „ „ „ Science	14
	„ „ „ „ Language	20
	„ „ „ „ Hindi	6
	„ „ standard of English	16
	„ „ all subjects	42
	„ „ discipline	15
	„ „ moral standards	9
	(54 other indicators with frequencies of 5 and below)	
Wastage	Wastage	34
	Deplorable rate of failures	9
	(6 other indicators with frequencies of 5 and below)	

Criteria of Standards

Content analysis of the materials obtained from the experience survey has shown that the quality of students, deterioration in their educational life, and wastage are the main pegs that hold the framework of educational standards (vide Tables 3 and 4). A detailed examination of the materials further shows that standards are described in terms of two main factors: (a) quality of the educand, and (b) achievement level.

The quality of the educand is best determined by two indicators: indiscipline and deterioration in moral standards. Between the two the problem of indiscipline is the most discussed. But most institutions for women and some for men find no such problem in them. There are also special types of institutions like public schools, where the problem is absent. It is interesting to note that the symposia on educational standards referred to earlier give scant attention to indiscipline as an aspect of standards in education.

Those who equate standards with achievement level often distinguish between command over tools of knowledge, achievement in instrumental skills, and mastery or possession of faculties like memory, thinking, reasoning, and judging that from the higher stratum of abilities. Poor results in examinations cited as evidence of falling educational standards imply the acceptance of standards as an achievement level.

The quality of the teacher affects both the quailty of the educand and the achievement level. Content analysis however reveals that the difference between criteria and causes of indicators pertaining to 'Quality of Teachers' is statistically least significant. This may be due to inadequacy of the sample studied or lack of perspicacity on the part of respondents, This may also be due to the cyclic character of maintenance of educational standards indicating that when teachers fall in standards there is fall in the standards of student acquisition, etc., due to feedback which is positive resulting in cumulation of effects. When teachers tend to slip and fall they are not able to control the slip and fall of students but rather accelerate it. Teachers are not merely *the bearers of the insignia of standards*; they are the insignia themselves.

In general, content analysis of 'Criteria' reveals that the concept of standards can be built up from elements like

Lack of knowledge — general and specific
Lack of expression — oral and written
Lack of achievement — general and situational
Lack of behaviour—social and moral.
Lack of capacity—to take and to give

How to improve standards

Suggestions to improve standards in education include measures to tackle student indiscipline, continuous assessment of student achievement during course work, adequate training in fundamentals early in schooling, inclusion of oral examinations, improvement in teacher quality, establishing parent-teacher associations, improving educational administration, and starting model universities.

In the present study itself, indicators that stood more significantly as "Causes" (Table 3) belong to the following areas:

Expansion of Education.
Defects in the Educational System.
Defects in Organization.
Maladministration.
Defects in Examination System
Quality of Educational Institutions
Quality of Textbooks; and
Home Conditions of Students.

Here, too, expansion of education, defects in the educational system, defects in examination system, and the quality of educational institutions have many more fingers pointed at them than those that point to the other four areas. These eight areas in the educational set-up need immediate scrutiny for rigorous measures to be adopted to improve standards in education.

The vicious circle in falling standards due to the quality of teachers and defects in the curriculum (Table 3)—both as criteria and causes—should be cut immediately to eliminate positive feedback of low quality input in both. Yet this positive feedback has its brighter side, i.e., if teachers and curricula are good, then, there must be rise in standards automatically. Selection of teachers and their training, and curriculum development demand immediate concern to raise standards; or perhaps to prevent their fall, more than reforms elsewhere.

Suggestion for an Empirical Inquiry into 'Fall'

In view of the analysis of 'standards' presented in this study it is possible and desirable to institute an empirical inquiry into the widely held belief that educational standards are falling. The inquiry may possess three phases. In the first phase, the inquiry should be confined to a typical district where the "fall" is relatively indubious. A suitable sample of the educands of the district, drawn on the basis of density of population class, stage or type of education, may be subjected to selected or improvised tests of knowledge, skills and attitudes in significant educational areas. and studied on the basis of specially prepared questionnaires and interview schedules. The records so obtained may be compared with the records of the educands of an earlier generation, matched in important and relevant variables. The tools and designs found satisfactory in the first phase of the inquiry can then be used for the second and third phases in which the inquiry is extended to the State and then national level. Such an inquiry may be undertaken for reasons stated in the beginning.

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Religion, Caste, Class and Parental Educational Aspirations in a North Indian Community[1]

S. P. Jain

In this paper the author reports the empirical findings regarding the levels of educational aspirations of parents for their sons. The data were collected in a middle-sized town of western Uttar Pradesh. It was found that the father or the head of the household, as a decision-maker in the Indian society, is influenced by factors of religion, caste and class affiliation. All the three factors play an important role in determining his educational aspirations for his sons. While the study of educational aspirations is considered as an index of educational mobility, it is found that the pace of educational mobility is very slow in Indian society in general and in the small town under study in particular.

The data collected by different sociologists reveal that differences in education are closely related to social staratification. In this connection, Bottomore (1962) observed that wherever there is a system of social stratification, there is a corresponding differentiation in the educational system. However, the pattern of education is likely to differ from one society to another. For example in a traditional society, the parents tended to aspire only for that much of education for their sons which is just sufficient for their acquiring the parental occupations. Here, an individual follows the heriditary principle as a basis of social organization. On the other hand, in a highly industrialized and urbanized society, the parents tend to provide education to their children according to their socio-economic conditions. In such societies education, therefore, tends to be more intimately related to social structure.

Admittedly one's attainment of education depends upon the socio-economic conditions of his family and availability of educational facilities in his society; however the educational aspirations of parents also play a vital role in the attainments of education of their children. The educational aspirations of the parents, in turn, are governed by a number of factors such as religion, age, education, occupation, family background, and so on so forth. For example, Mullingan (1952) in his study in the United States showed that social class background is correlated with access to education.

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[1] The data on which this paper is based were derived from the author's doctoral dissertation for the Punjab University, Chandigarh. The author is grateful to B. C. Muthayya, H. D. Laxminarayana and H. S. Verma of the National Institute of Community Development, Hyderabad for their useful comments.

In recent years, a number of Western sociologists have conducted studies on educational aspirations of college students and also parental educational aspirations for their sons. [2] They have found that factors such as education, social class and economic position, etc., of the parents play a vital role in the educational aspirations of the people. However, in India most of the studies on educational aspirations have been conducted in the laboratory or on students, and a few attempts have been made to study the educational aspirations of the parents for their sons (Pareek and Chattopadhyay, 1965). Nevertheless, the importance of such studies in India lies in the very fact that this country is in the process of all round development and the educational facilities coupled with rapid industrialization and urbanization are increasing day by day. In this situation, the different groups of the society tend to exhibit different patterns in their educational behaviour. How have the different groups of the society reacted to this situation? This could be judged through a study of educational aspirations

From the above standpoint the purppse of this paper, then, is to: (a) study the educational aspirations of the parents for their sons, and (b) to determine the extent to which the educational aspirations of the parents are related to the pattern of social stratification in a given community The aspects of social stratification covered here are (a) religion, (b) caste and (c) class. The ensuing analysis is based on the following assumptions: (a) that the father or the household head, as a decision-maker in Indian society, is influenced by his religion, caste and class affiliation in aspiring education for his son; and (b) that there is an upward trend of educational mobility among people, if educational aspirations of the people are taken as an index of social mobility.

The Universe of the Study

The data forming the basis of the present paper form part of a larger study of a middle-sized town in western Uttar Pradesh (Jain, 1967a). At the time of investigation (1962), the population of the town was nearly 19,000 (1961 census). The town was inhabited predominantly by two religious groups, namely the Hindus (38 per cent) and the Muslims (62 per cent),

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[2] Some of these studies are: R. A. Mullingan, "Socio-Economic Background and College Enrolment," *Amer. Sociol. Rev.*, April 1951; Lamar T. Empey, "Social Class and Occupational Ambition," *Amer. Sociol. Rev.*, December 1956; Archie O. Haller and W. H. Sewell, "Farm Residence and Levels of Educational and Occupational Aspiration," *Amer. J. Sociol.* January 1957; Bernard C. Rosen, "Race, Ethnicity and the Achievement Syndrome," *Amer. Sociol. Rev.*, February 1959, Irving Krauss, "Sources of Educational Aspirations among Working Class Youth," *Amer, Sociol. Rev.*, December 1964.

Though there were other religious groups also such as Sikhs, Jains and Christians, they were numerically insignificant. Each religious group was subdivided into several caste and occupational groups. As regards the educational facilities in the town under reference there were only three higher secondary schools and four primary schools. For college education the people of the town were dependent on colleges of the nearby towns. A large, majority of the population of the town was engaged in agricultural pursuits and, as such, its economy was predominantly agricultural. Thus, the social structure of the town was characterized by a multi-religious and multi-caste agrarian community (Jain, 1967b).

Methodology

The data forming the basis of ensuing analysis were gathered with the help of an interview schedule, administered on 236 heads of households. The sample was drawn by method of systematic random sampling from amongst 2,832 heads of households in the town (1961 Census). Of the 236 respondents, 81 were Hindus and 155 were Muslims. It may, however, be noted that this method of drawing the sample was chosen with a view to get adequate representation of every section or the population of the town. But it was found that the proportion of Hindus and Muslims in the sample so drawn did not correspond with the general proportion of the population of town; the Hindus are under-represented in the sample. This may be attributed to the pattern of population-concentration of the town and the list of households prepared thereof. As per the pattern of residential areas of the town, while in some areas one particular group predominates heavily, in others there is a mixed population in varying proportions. And as the list of the households was prepared indiscriminately, there was every possibility of some marginal differences in the sample population. It is quite possible that some Hindus could not be drawn in the sample due to the housing pattern.

While interviewing, each respondent was asked to mention his educational aspirations for his sons. Initially, the responses were collected according to the general standard of the schooling in the community. These responses were later on classified into six levels of educational aspirations: (1) Primary; (2) Secondary; (3) College; (4) Professional; (5) Technical and (6) Commercial. In most cases the respondents gave the desired reply about their aspirations but in some cases the respondent either expressed his inability to answer our question as he had no child or simply said, "It all depends on God and the fate of the child". However, the non-response data came mainly from the respondents who did not have any child. The margin in these two types of responses was too narrow to permit any further elaboration.

The hierarchial arrangement of caste-groups and occupational classes was drawn from the larger study of the town (Jain, 1967b). The various caste and class categories used were: (1) the upper; (ii) the upper middle (iii) the lower middle and (iv) the lower. The different castes were placed in a hierarchial order with the help of a separate enquiry on social grading of castes in the given community (Jain, 1966.) Similarly, the class structure of the town was evolved on the prestige criteria of the different occupations. Thus, the upper class consists of people who were pursuing occupations of higher prestige and the upper middle class people belonged to those occupations which were relatively less prestigious. The same holds true for the lower middle and lower classes (Jain, 1966).

Analysis

It is evident from Table 1 that a majority (37.2 per cent) of respondents from the total sample have aspired for Secondary education. The next highest percentage (21.2) is of those who have aspired for Primary education followed by 16 per cent respondents who have aspired for education upto College level. The respondents who have aspired for Professional and Technical education are by and large in equal percentages. Further analysis of data in terms of religious groups reveals that as many as 32 per cent Hindu respondents have aspired for Secondary education. The respondents who have aspired for Primary, College and Technical education are by and large in equal percentages. The percentage of those who have aspired for Professional education is also very near to each other in both the communities.

TABLE 1

Educational Aspirations of Hindus and Muslims
(In percentages)

Level of Education		*Hindus*	*Muslims*	*Total*
Primary	.	14·8	24·0	21·2
Secondary	..	32·0	40·0	37·2
College	..	14·8	16·1	16·0
Professional	..	11·1	7·1	8·4
Technical	..	13·6	3·9	7·2
Commercial	..	2·5	—	0·8
Uncertain	..	11·1	8·4	9·2
Total	.	100·0 (81)	100·0 (155)	100·0 (236)

Among Muslims 40 per cent respondents have aspired for Secondary education, followed by 24 per cent and 16.1 per cent who have aspired for Primary and College education, respectively. A meagre percentage of respondents have aspired for Professional and Technical education, and none for Commercial education.

By way of comparison, it may be said that Muslim respondents have aspired for low levels of education, viz., the primary and secondary in larger percentage as compared to Hindu respondents. The total number of Hindu respondents who have aspired for college, professional, technical and commercial education is, on the other hand, larger than the Muslim respondents. Significantly, more Hindu respondents were uncertain about the education for their sons as compared to Muslim respondents.

Educational aspirations of Different Hindu and Muslim Classes

There seems to be an intimate relationship between the hierarchy of caste and aspiration for higher education among the Hindus. It is obvious from the data given in Table 2 that a majority of Hindu respondents belonging to the upper and upper middle castes have aspired for higher educational categories like Secondary, College, Professional, Technical and Commercial. On the other hand, respondents of lower middle and lower castes have not aspired for these categories. But they have mainly aspired for Primary, Secondary, and College education. Nevertheless, a fairly good percentage of respondents from all the four caste categories is observed majority of respondents aspire for education of their children. A good aspiring for Secondary and College education. This broadly shows that a many respondents of the lower caste have however, aspired for Primary education only. A small percentage of respondents, on the other hand. from upper middle, lower middle and lower castes are uncertain about it. On the whole, the majority of Hindu respondents have aspired for Secondary and College education. It is also noteworthy that technical education has been aspired for by 13.8 per cent of respondents. Moreover, the upper and upper middle castes respondents have aspired for thistype of education in a fairly high percentage, i.e., above 30 per cent.

TABLE 2

Educational Aspirations of Different Caste Groups of Hindus
(In Percentages)

Level of Education	*CASTE*			
	Upper	*Upper Middle*	*Lower Middle*	*Lower*
Primary	—	—	8·7	34·4
Secondary	25·0	15·4	47·7	31·0
College	6·5	23·0	17·4	13·8
Professional	25·0	23·0	—	6·9
Technical	31·0	30·9	8·7	—
Commercial	12·5	—	—	—
Uncertain	—	7·6	17·4	13·8
Total	100·0 (16)	100·0 (13)	100·0 (23)	100·0 (29)

The relationship between the hierarchy of caste-groups and aspiration is not so marked among Muslims (See Table 3). This is not to suggest that the upper or upper lower castes of this group have not aspired for good education for their children. As many as 47.3 and 17.5 per cent respondents from the upper and 32.3 per cent and 6.5 per cent from the upper middle castes, respectively, have aspired for secondary and college education. The respondents of the lower middle and the lower castes have also aspired for similar educational levels more or less in equal percentages, namely, 8.1 per cent and 12.9 per cent, respectively. However, the aspiration for primary school education by a fairly good percentage of respondents of upper and upper middle castes is somewhat surprising. It is noticeable that as many as 17.6 per cent of the respondents of the lower middle caste have aspired for technical education. On the whole, the respondents of this caste-group have aspired for higher educational levels in fairly good percentages as compared to other castes.

TABLE 3

Educational Aspirations of Different Caste Groups of Muslims
(In Percentages)

Level of Education	*CASTE*			
	Upper	*Upper Middle*	*Lower Middle*	*Lower*
Primary	18·9	38·6	5·9	33·3
Secondary	47·3	32·3	29·4	36·4
College	17·5	6·5	23·6	18·0
Professional	8·1	12·9	5·9	—
Technical	4·1	—	7·6	—
Commercial	—	—	—	—
Uncertain	4·1	9·7	17·6	12·2
Total	100·0	100·0	100·0	100·0
	(74)	(31)	(17)	(33)

Thus, the Muslim respondents, as a whole, have aspired for Secondary education, in the majority, followed by Primary and College education. The respondents of the lower castes are uncertain in a higher percentage than the upper castes.

Educational Aspirations of Different Hindu and Muslim Classes

A majority of Hindu respondents from the upper and upper middle classes have aspired for higher educational levels like Secondary, College, Professional and Technical Education, as seen in Table 4.

TABLE 4

Educational Aspirations of Different Classes of Hindus
(In Percentages)

Level of Education	*CLASS*			
	Upper	*Upper Middle*	*Lower Middle*	*Lower*
Primary	—	—	10·5	11·5
Secondary	44·4	17·0	21·0	52·3
College	17·00	27·7	10·5	9·2
Professional	11·0	27·7	21·0	7·7
Technical	27·6	22·0	21·0	3·8
Commercial	—	5·6	—	—
Uncertain	—	—	—	15·4
Total	100·0	100·0	100·0	100·0
	(18)	(18)	(19)	(26)

But the respondents belonging to the lower middle and lower classes do not deviate from the upper and upper middle class people in this respect. A fairly good percentage of respondents from the two lower classes have aspired for the higher type of education. However, a majority of respondents aspire for Secondary and College education. Primary education has been aspired for by only a small percentage of respondents belonging to the lower middle and lower classes. Thus, the association between the hierarchy of Hindu classes and level of education is found to be only to a limited extent.

On the other hand, it is observed from Table 5 that the different classes of Muslims also exhibit a similar tendency but to a limited extent. An irregular increase and decrease in the educational aspirations of different classes is observed. For example, the respondents of the lower middle class have aspired for Primary education in much less proportion than their immediate upper and upper middle class neighbours. So also Technical education has been aspired for by a fairly good percentage of respondents belonging to this class. It is thus evident that a majority of respondents from different classes have aspired for secondary and college education.

TABLE 5

Educational Aspirations of Different Classes of Muslims
(In Percentages)

Level of Education	CLASS: *Upper*	*Upper Middle*	*Lower Middle*	*Lower*
Primary	24·0	21·4	8·0	30·0
Secondary	41·4	35·7	44·0	40·0
College	15·1	21·4	28·0	18·0
Professional	10·9	14·3	—	—
Technical	6·5	—	12·0	—
Commercial	—	—	—	—
Uncertain	2·2	7·1	8·0	12·0
Total	100·0 (46)	100·0 (14)	100·0 (25)	100·0 (70)

Discussion

The foregoing analysis clearly shows that the factors of stratification such as religion, caste hierarchy and class affiliation do influence the educational aspirations of the household heads for their children. It was evident that the respondents belonging to the two religious groups aspired for different levels of educational attainment for their children and so did the respondents belonging to the different caste and class categories. Since our class divisions were based on the prestige criterion of occupations, it could be said that people belonging to occupations of higher prestige aspired for higher levels of education and those belonging to lower ones aspired for lower education. This was true for Hindu and Muslim respondents alike.

As the Indian society is moving rapidly towards industrialization and urbanization, the educational aspirations of the people are also increasing. However, in the light of foregoing analysis it may be said that the educational aspirations of the people are influenced by a number of factors such as religious affiliation and hierarchy of caste or class to which they belong. Most of the respondents belonging to different caste categories and classes have aspired for education in different fashions. More specifically, the respondents belonging to the higher caste have aspired for higher education for their children in larger number than to those who belonged to the lower caste or class. However, this relationship was more intimate in the case of Hindu respondents than Muslims. It suggests that the stratification pattern is more pronounced among the Hindus than the Muslims.

On the whole, we saw that the educational aspirations of the people are not very high. It may be because of occupational pattern of the town, wherein a majority of population is engaged in agricultural pursuits (Jain, 1966). It is generally believed that in an agrarian economy the parents generally do not want to send their children for higher education. Instead, they prefer to use them as a helping hand in the agriculture. It may be due to this fact that the educational aspirations of the Hindus were high, since a majority of Hindu respondents were engaged in non-agricultural pursuits. Thus, these differences in the two religious groups appear to be due to diversity in their occupational differentiation. Furthermore, the low level of educational aspirations of the people, indicate that the pace of social mobility through education is still slow.

Conclusion

In the earlier part of this paper we had proposed two assumptions and in the light of the foregoing analysis we can say that our assumptions are very correct. All the three factors were found to be related with the educational aspirations of the household heads though the degree of relationship was different between the two religious groups. According to Sewell (Sewell et. *al.*, 1957) the study of educational aspirations can help us in understanding the trend of social mobility in a given society. From this angle, we found that the pace of educational mobility is very low as the majority of the respondents had low educational aspirations.

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Development of a Test to Measure the Leadership Style of Headmasters

Shalini Bhogle

The author describes in detail the development of a test to measure the leadership style of headmasters.

The present paper discusses the details of the development of a test to measure the leadership style of high school headmasters. The test was developed for use in an investigation on the factors influencing the acceptance of innovations by our high schools. Needless to say, the headmaster, even of a government school, is an important element in the functioning of a high school, especially in making it innovative and progressive. An imaginative headmaster may be a positive asset to the institution in this direction, while many headmasters are still far from playing this effective role. A headmaster by virtue of his position is expected to provide leadership to the institution. Therefore, the leadership style of the headmaster was selected as an important variable in the main study.

Investigations on leadership style have been carried out by many investigators in military (Jenkins, 1947), business (Kenneth, 1961), and community (Stogdill and Shartle, 1948) settings. But there have been relatively few investigations on the leadership style of high school headmasters. Even after considerable efforts, the present investigator found it impossible to lay her hands on any ready made test to measure the leadership style of high school headmasters, and hence the need was felt to develop the present test.

The background

This tool borrows the three leadership categories and their definitions from the pioneering study of White and Lippitt (1943). But it differs from them in a few major directions, the deviation being built into the problem. Unlike in Lippitt's study (1940) the leader and the group of the present sample is non-experimental and relatively permanent.

Secondly, the headmaster is already placed in a 'leadership' position, for reasons of seniority, contacts, etc., which are extraneous to the leadership potential, and he has to discharge the leadership duties. The group usually accepts him as a hierarchical leader without necessarily accepting him for all that as a natural leader. Although the leadership styles 'autocratic', 'democratic' and 'laissez-faire' have been postulated for convenience, they merely indicate predominance of one style in a subject over the other two styles. Since any headmaster is seldom a stereotype of a particular style, it was necessary to develop a tool that could help to indicate the normal bent of his personality under a given situation. After exploring several possibilities, and taking into account the nature of the main investigation, it was decided to develop a 'situational test'. Such a test while rendering itself useful for a large-scale investigation, would at the same time yield responses more valid than the ordinary questionnaire. The present 'situational' type of test in which the subject is invited to play his natural role could perhaps be a satisfactory solution.

Development

The final form of the present situational test is actually the outcome of two previous forms attempting, each in its own way, to measure the leadership style of the school headmaster.

The Initial Draft

The initial draft drew heavily upon Fredriksen's (1962) in-basket model (constructed to study the leadership styles of business managers). A number of situations that a headmaster normally faces were itemized in the form of letters, notes and memoranda from different sources like parents, assistant teachers, students, the school management committee, Extension Education Department, the Directorate of Public Instruction, etc. These items were intended to be presented to the headmaster in the form of his mail in the in-tray. The headmaster would then be invited to dispose of these items in his customary manner, making customary endorsements, etc.

This initial draft was in reality the result of wading through the actual mail in-basket of a selected half dozen headmasters and informal discussion with them on their responses to these letters. In the beginning the intention was to request the headmasters to answer their in-basket tests by writing in their responses exactly on the model of Fredriksen's (1962) in-basket test. The difficulties in such a procedure were soon obvious. With write-ins, theoretically a large number of different responses were possible and, with shades of variation, it would have been difficult to assign a response accurately to any given category, autocratic, democratic, etc., without the investigator's subjective element surruotitiously intervening. In view of this difficulty, the test needed to be modified.

The Second Draft

The actual letters and memoranda were, therefore, modified so as to represent a true letter that would bring out definite responses which could be assigned to a category of any given style.

The modified draft was shown to two headmasters for their opinion regarding the naturalness of the situation. This modified draft now consisted of a statement (representing an actual situation) followed by five responses, each response representing one style of leadership. At this stage, five response choices were offered to the subjects to correspond to the following five styles of leaderships: autocratic, bureaucratic, laissez-faire, consultative and democratic. To validate the test, the test draft along with definitions of the five styles were sent to four experts in the field and they were invited to say if the choices truly represented the style as set forth in the definition, In the opinion of the experts the five choices were not always mutually exclusive and in particular 'autocratic' overlapped with 'bureaucratic' and 'democratic' with 'consultative'. Therefore, the number of leadership styles were reduced to three and thus in effect White and Lippitt's (1943) categories of leadership were accepted as also their definitions of these styles.

The Third Draft

The third draft, which now consisted of 16 situations each accompanied by three response styles and the accepted definitions of each style, was now posted to 60 workers in the field of education and psychology for validation. Thirty persons returned the questionnaires with their comments and suggestions. The experts were requested to put a tick mark (√) against the response style which they thought was compatible with the accompanying definition for the particular style, and a cross (x) where it was not compatible. The experts' opinions were then tabulated. Table 1 shows the distribution of the experts' opinion in the percentage form.

TABLE 1

Percentage distribution of compatible choices for the three styles of leadership

ITEM NO.	DEMOCRATIC	AUTOCRATIC	LAISSEZ FAIRE
1.	95	85	85
2.	85	100	90
3.	100	100	70
**4.	90	65	80
*5.	75	70	55
6.	75	100	90
7.	90	95	90
**8.	80	70	75
*9.	75	90	85
10.	95	95	95
***11.	85	90	65
12.	95	80	95
13.	100	100	100
14.	90	100	95
15.	85	90	75
*16.	70	85	30

*Items rejected in the final draft on grounds of low compatibility
**Items reworded in the final draft to increase autocratic bias
***Item rejected as repetitive

It was necessary at this stage to develop a criterion for compatibility and the percentage of 75 per cent and above was decided as suitable. Eleven items satisfied this criterion and showed 75 per cent of compatibility for all the three response styles. Item numbers 4 and 8, showing 90 per cent, 65 per cent and 80 per cent, and 80 per cent, 70 per cent and 75 per cent compatibility, respectively, were then slightly reworded to increase the autocratic bias. Items 5 and 16 were rejected on grounds of very low compatibility. Item 11 could have been brought to the level of other items but it was felt to be repetitive of another item and was therefore rejected. The final draft of the questionnaire is given in the Appendix.

The Pilot Testing

This draft was now posted to 40 high school headmasters working in Hyderabad District. Twenty-one usable forms were received in a period of 45 days. These were tabulated in a manner such that the number of "autocratic', 'democratic' and 'laissez faire' scores for every person and each item could be easily counted.

For convenience every style was uniformly scored as 1 for a unit item. Thus a person gets a score of 'x' democratic, 'y' autocratic and 'z' laissez faire to make a total of 13 items. The frequencies obtained were then converted to percentages out of the maximum possible of 21 for any category.

TABLE 2

Distribution of the three styles for the 13 *situations*

SERIAL	DEMOCRATIC		AUTOCRATIC		LAISSEZ FAIRE	
NO.	*Frequency*	%	*Frequency*	%	*Frequency*	%
1.	7	33%	14	66%	0	—
2.	15	71·4%	4	18·8%	2	9·4%
3.	12	57·1%	5	23·8%	4	18·8%
4.	16	76·2%	2	9·4%	3	14·3%
5.	10	47·6%	11	52·4%	0	—
6.	13	62%	6	28·6%	2	9·4%
7.	19	90%	1	5%	1	5%
8.	18	85·7%	3	14·3%	0	—
9.	9	42·9%	3	14·3%	9	42·9%
10.	12	57·1%	1	5%	8	38·1%
11.	19	90%	2	9·4%	0	—
12.	16	76·2%	5	23·8%	0	—
13.	15	21·4%	3	14·3%	1	5%

This distribution shows that Items 7, 8 and 11 tend to elicik strong democratic responses or tend to be more desirable socially than the corresponding autocratic and laissez-faire styles. Hence the choices for the democratic style were reworded in such a way that the element of the social desirability in these items could be reduced so that they would appear more as natural responses.

This revised form was now accepted as final. Since the main study was intended to be carried out on a school, accompanied by sub-studies for teachers and headmasters, the sample had to be restricted only to 30 schools, and therefore to only 30 headmasters.

The Final Testing

The final form was personally handed over to 30 school headmasters. They represented government schools, private schools and aided schools, and varied in age from 35 to 60 years and had a teaching experince of 10 to 40 years. Their responses were tabulated as in the pilot study and it was noticed that the responses followed a similar pattern as in the pilot test. Table 3 shows the responses of 30 headmasters for the 13 situations with the corresponding percentages for the pilot sample.

TABLE 3

Responses of 30 *Headmasters for* 13 *situations*

ITEMS	DEMOCRATIC		AUTOCRATIC		LAISSEZ FAIRE	
	Frequency	%	*Frequency*	%	*Frequency*	%
1	12	40·00% 33·00%	16	53·3 % 66·0%	2	(0·0) %
2	28	93·3 % *71·4 %	1	3·3% 18·8 %	1	3·3 % * 9·4 %
3	23	76·6 % *57·1 %	4	13 3 % ·23·8 %	3	10·10% *18 8 %
4	27	90·0 % *76·2 %	3	10·10% * 9·4 %	0	*14·3 %
5**	24	80·0 % *47·6 %	4	13·3 % *52·4 %	2	0 6·6 %
6	23	76·6 % *62·0 %	5	16·6 % *28·6 %	2	0·0 6·6 %
7	22	73·3 % *90·10%	6	20·0 % * 5·0 %	2	6·6 % *5·0 %
8	24	80·0 % *85·7 %	5	16·6% *14·3 %	1	3·3 % 0·0 %
9	13	43·3 % *42·9 %	7	22·2 % *14·3 %	10	33·0 % *42·0 %
10	22	73·3 % *57·1 %	4	13·3 % * 5·0 %	2	6·6 % 0·0 %
11	26	86·7 % *90·10%	3	10·0 % 9·4 %	1	3·3 % 0·0 %
12**	2	3·3 % *76·2 %	24	80·0 % *23·8 %	4	13·3 % 0·0 %
13	27	90·0 % *71·4 %	2	6·6 % *14·3 %	1	3·3 % 5·0

*Corresponding value for the same items in the pilot study
**Items whose value shows a very large deviation from the corresponding values for the pilot testing

Results

A comparison of the two test responses shows that, on the whole, the test for the two samples follows a uniform pattern in the two samples except for Items 5 and 12 which show marked deviations in the two styles: the 'democratic' and the 'autocratic'. (The numbers with the asterisks show the percentage obtained in the earlier sample.) The range for the democratic responses was from 4 to 12 with a median of 9.75. Hence it was assumed that all those headmasters with score of 10 and above for the 'democratic' style could be called as "democratic headmasters' and those with 9 and below as less democratic headmasters. On the basis of this categorization, 16 out of 30 turned out to be 'democratic'.

Similarly, the range for the 'autocratic' style was from 0 to 8 with a median of 2.3. Therefore, all the headmasters with a score of 3 and above for 'autocratic' style responses could be called as 'autocratic headmasters'.

On the same lines a certain number of headmasters could be called as 'laissez-faire headmasters'. But these laissez-faire headmasters were, in reality, 'non-leaders' in a nominal leadership situation without the decision-making prerogatives of a headmaster. In actual practice, the power rested with others who used the headmaster as a 'front'. The laissez-faire-style responses are mainly constructed to find out this type of headmaster.

Discussion

The results show that the items corresponding to the democratic style of leadership were selected to a far greater extent than the autocratic style and, some may, therefore, conclude that the test is biased and the so-called democratic style possessed an element of social desirability. But this conclusion may not be necessarily warranted.

It is possible that a good majority of present-day headmasters *are* democratic or at least *tend to be* democratic. This was to a certain extent confirmed by observation of the behaviour of the headmasters in their dealings with their teachers. Further, discussions with teachers also tended to confirm the results of the test. It was, however, found very difficult to quantify the ratings of teachers. This type of validation had to be informal.

There was a similar difficulty in finding the reliability of the test. It was not possible to construct a parallel form similar to the earlier one. The number of items was only 13 with 3 different choices and the split-half reliability was impossible. The only possible procedure left was the test—retest reliability, which involved requesting the same persons to re-do the test. The headmasters were requested to fill in the same forms again, but the behaviour style of the first four or five persons contacted was disappointing. They uniformly hesitated to go through the test and told the investigator that they had given careful attention and a good amount of thought to the test while answering it earlier; they did not think they would shift from their previous opinions within a period of two months. It may, however, be possible for further workers to select a uniform parallel sample and study the results.

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APPENDIX

INSTRUCTIONS: In the following I have made an attempt to collect a few representative models of the various letters and notes that you as a headmaster may be receiving in your office. You may be reacting to these letters in your own personal way depending on the type of the letter and the existing conditions, in your school. These could be innumerable, but for my convenience I have framed only three statements for each. Please read them and put a mark against the statement of the action which you would have taken, for the presented situation. If you think none of these could by your possible reactions please try to find one that appeals nearest to your choice, make a mark against it in the answer sheet provided. Please do not omit any item.

1. In order to attend a workshop meant for headmasters, you are to be away from the school for four months. The annual examination of the school and new admissions would be conducted during this period. It is not compulsory for you to attend the workshop.

   A. I shall ask the school management to make suitable arrangements in my absence and attend the workshop.

B. I shall attend the workshop, our teachers are well experienced. They can run the school quite efficiently even in my absence. I shall distribute the charges amongst the teachers and the assistant headmaster will be in over all charge.

C An headmaster worth his salt cannot be away from the school for a long period of four months especially at the time of examination and admissions. If it were a shorter period, the assistant headmaster would have managed it. In this case I will not attend it.

2. The Director of Public Instruction has written to you, to undertake the responsibility of housing and organising a training camp with participants from 10 schools, during the December vacation. Your teachers are very reluctant to have it in your school. You are expected to reply to the D.P.I.

A. I shall write to the D.P.I. that the School will undertake the responsibility, and shall tell the teachers that they have to organise the camp whether they like it or not.

B. If the teachers are not willing then headmaster cannot do any thing. I shall have to write to the D.P.I. that the school cannot organise the camp because the teachers are not wanting it.

C. The organisation of a camp is a creative activity. The school and the staff are likely to get some opportunity to learn how to organise a camp. So, I shall discuss with the teachers to make it possible as good as they can.

3. One of the assistant teachers has suggested a new way of scheduling the work-load of teachers through a committee of teachers.

A. If the teachers come forward to manage their own work through a joint cooperative system, I shall join them in the enterprise and shall welcome such an initiative as it provides sharing of experience and ideas.

B. I consider, it will make things difficult for me to maintain discipline amongst the teachers. Afterall scheduling the work-load is headmaster's duty and, I do not want others to do it for me. I cannot accept such a proposal.

C. Scheduling is not so important as to require my attention. If the teachers want to decide what should be done let them decide. I shall approve the plan.

4. The governing body of the school is of the opinion, that you as an headmaster did not use sufficient tact in handling students strike, and consequently the school was put to considerable loss and damage. They have asked you to send in your explanation if any.

A. I will explain that in meeting the situation I have been continuously in touch with my colleagues for adopting a suitable course of action. And I think it was the best under the circumstances of which I assume the full responsibility.

B. I considered it was futile to meet the agitated students, they were in a violent mood. Nothing better was possible in the situation.

C. With all the power that I have as an headmaster, I tried to suppress the Students, but apparently the students were out of control. Of course I feel that deterrent punishment should have been given.

5. You receive a request from some brilliant students of the final year class that they want some extra coaching for the coming Public Examination in order to secure higher ranks.

A. It is difficult to arrange such classes as, I cannot impose additional burden on the teachers under the existing rules. So let the students make their own arrangements.

B. I shall encourage the students for this initiative, but tell them that I like to discuss the matter with the other teachers and possibly the teachers' committee may find a way out.

C. Since, rank holders are a matter of prestige to the school I shall send a circular to the teachers assigning some of them for the extra coaching class.

6. A lady teacher had a delivery early in the summer vacation. She has applied for maternity leave from the date of re-opening of the school after the summer vacation. The rule governing the maternity leave is rather vague, (as to when this period of two months should commence) and much depends on your discretion.

A. The teacher has had enough rest when she needed it, and she should join the school on completion of two months from the date of delivery.

B. I have to find out from her how many days of leave she thinks she would need, after the reopening, and if it is reasonable shall help her to have it.

C. I do not think I have much to do in this case. I shall simply recommend the application for two months of maternity leave.

7. A very influential member of the school mangement asks you to admit his below normal child in your School. In admission is likely to affect the discipline of the class and so the class teacher has advised you against this admission. You know the admission would help the school in getting more grants.

A I think it would be in the interest of the school to admit the child, one dull child in the class will not affect the class materially. But the grant will surely be helpful for the school and could even be used to improve many such children.

B. I shall circulate the letter among other teachers for their opinion and shall ask the Assistant Head Master to decide in the matter.

C. I shall ask a competent teacher to study the child carefully. On the merit of report the class teacher and I shall jointly take the decision, if the child should be admitted or not.

8. You get a letter from a parent that his son was beaten up by bigger and stronger classmate for refusing to do the home-work for him. On inquiries you find that the complaint was valid.
   - A. Quarrels among the students are numerous and so often that a single headmaster of such a big institution cannot afford to waste time in investigating them However, I shall try to speak to the miscreant and inform the father accordingly.
   - B. I shall mete out severe punishment to the bigger boy and warn him that in case he misbehaves again, he would be rusticated.
   - C. I shall discuss the incident with the class as a whole and also discuss with the teacher for finding ways such that the two boys are able to do their home work themselves.

9. You receive an application from your assistant teacher requesting you to relieve him of his job as he has secured a better one elsewhere. You did not know that the teacher had applied elsewhere. Rules require, that application for any job should be sent through you. If the teacher is relieved now, teaching would greately suffer.
   - A. I shall call for the explanation of the teacher and tell him that he cannot be relieved, as he did not apply through proper channel. I do not want the school work to suffer and shall warn him, that in future applications should be sent through the Headmaster.
   - B. The teacher is to be relieved as it is a better job. I cannot ask him to continue when he is not willing. I shall explore what alternative arrangements could be made to relieve him.
   - C. The teacher should see the Secretary of the Manging Committee and get his clearance. Personally I do not have any objection, afterall, no one is indispensible.

10. You have received a note from the Students' Union of your School (obviously under outside inspiration) that they would go on strike if the evaluation of the examination papers is not made more leniently.
    - A. I shall sit with the students to discuss with them about the suitable action regarding evaluation. To me strike is not the problem, problem is their dissatisfaction about evaluation.
    - B. I shall inform the Students' Union that if they went on strike or cause any disturbance severe disciplinary action will be taken against them.
    - C. I shall send the note to the governing body of the school and the Parent Teacher Association as, I consider the decision of what is to be done in such situation is upto them.

11. The governing body of the school considers that some weak students need extra coaching in some subjects beyond the school hours and you should make arrangements for it. You apprehend some resistance to this idea from some teachers.
    - A. I shall also share the extra work with my teachers, shall find out

they can volunteer to do the work by rotation, I shall also try to impress them that, the teachers credit lies in pulling a backward student up and here is an opportunity for them.

B. Teachers are full time employees of the school and it is a part of their duty to teach the subject well, it affects the school performance. They should attend to these backward children.

C. Shall forward the letter to the assistant headmaster to make suitable arrangements for these children. If there is something that I can do, I shall do so.

12. You heard a rumour that a certain teacher is very communal in his approach towards pupils. On preliminary inquiries, you understand that although there is exaggeration yet there was some truth in it. You also discover that communal tendencies were present in some other teachers also.

A. I think, as a free citizen every person has his own ways of thikning and I cannot go on correcting individual opinions or modes of thinking.

B. I shall convene a meeting of the teachers to discuss about communalism. Shall firmly point out that communalism is not conducive in a school situation. It is an unhealthy feature.

C. I shall call each of the teachers and tell him that there is absolutely no place for communal feeling in my school. If I find any body communal I can become ruthless to outcast such a person.

13. The assistant headmaster of the school who happens to be your colleague and friend over a long period of time suggests you in writing that the school teachers and students would show remarkable progress in their achievements if you reduce your check on them.

A. I can never trust my assistants and students. The assistant headmaster is too good to be a leader. I think he does not know that school would be a big mess if I do not check constantly.

B. As a headmaster as I think I was expected to take rounds, I used to go round but if that is a problem I may stop going around.

C. I have always been thinking for the progress of my school. I think I should try out this suggestion for a fortnight to see the results. If there is a worth while progress I shall willingly follow this suggestion.

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Construct Validity of Bloom's Taxonomy

Haribhai G. Desai

Since its publication in 1956, Bloom's Taxonomy has been extensively used in developing curricula, tests and teaching methods. In this paper the author outlines an experimental design to find out whether an empirical foundation for the widespread use of the Taxonomy does exist.

The *Taxonomy of Educational Objectives Handbook I: Cognitive Domain* (Bloom, *et al*, 1956) is a device for classifying educational objectives according to the cognitive processes which reputedly underlie the achievement of them. The handbook was devised by university examiners who needed a method for classifying test items so that communication on testing matters could be facilitated.

Handbook I: Cognitive Domain consists of a classification scheme in which a large number of educational objectives have been classified and the evaluation techniques appropriate to each class and subdivision presented and discussed. The six cognitive process levels, from least to most complex, are: (1) Knowledge, (2) Comprehension, (3) Application, (4) Analysis, (5) Synthesis, and (6) Evaluation. The processes are claimed to be hierarchical and cumulative. Each process is divided into subprocesses. For example, Synthesis is subdivided into: (i) production of a unique communication, (ii) production of a plan, or proposed set of operations, and (iii) derivation of a set of abstract relations.

HYPOTHESIS TO BE TESTED

We will discuss here a scheme of testing one particular hypothesis pertaining to the Taxonomy. The hypothesis under consideration is: "The arrangement of categories (in the Taxonomy) is hierarchical and the hierarchy is cumulative, i.e., any category includes the processes of all lower-order categories plus a unique component."

The hypothesis assumes that the processes are cognitive and that they are learned behaviours. Along with the authors, we presume that the processes transcend subject-matter content.

WHY TEST THE HYPOTHESIS

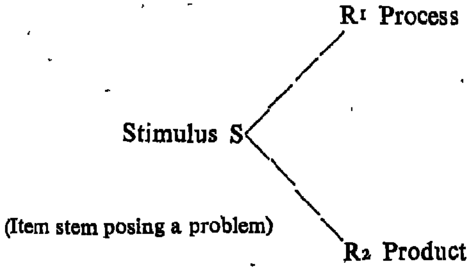
Since its publication in 1956, the Taxonomy has been extensively used by developers of curricula, tests and teaching methods. It has been used by the Biological Sciences Curriculum Study Group and also by some of the California school systems. Some use by industrial psychologists in classifying training tasks is also reported. An extensive programme for modification of the secondary school curriculum in India, on the basis of the Taxonomy has been in progress since 1958. Many books have been written on the basis of this Taxonomy. The Taxonomy has had a tremendous impact on the educational world and is regarded as a useful tool in many areas of education

Though the Taxonomy is extensively used, research furnishing an empirical foundation for the usage is lacking. We should find out whether the empirical foundation does exist. For example, if the categories are not hierarchical and cumulative, our training experiences based on it will be invalid, and the usefulness of the Taxonomy will be clouded.

Experimental Design

A. Response Measures

We will have two response measures: (1) the process response—whether the desired cognitive process is used by the subject, and (2) the product measure—whether the subject gives the "correct" response.



The item stem poses a problem, the solution of which theoretically requires the subject to master the relevant content and to manipulate it with the relevant mental process. The response is the interaction of the application of a mental process to a unit of subject matter content.

B. Steps Involved in the Procedure

1. Let us experiment on a group of say, 100 subjects. Let this be a normal group so that they display a wide range of ability and some of them are able to work with higher cognitive processes.

2. Because a solution to an item is contingent on both content and process and because the process is the variable to be measured, it is obligatory to equalize knowledge over subjects. If we plan to measure a particular item and if the subject had learned the solution to this item in the past, he will only need to recall and that will put the item on the bottom (knowledge) level. Thus content must be controlled.

All the subjects should be exposed to the content at the same time, and the content should be equally new for all the subjects. One way to do this would be to introduce, at the time of the test, the content which is equally unfamiliar to students. We can preface the test with a reading passage. Another approach to control the content would be to use programmed material. (The other possibilities also exist. We can select content which obviously had been already overlearned by the subjects. Or, we can instruct subjects in a content until they reached a predetermined level of mastery prior to administering Taxonomy-type tests. But both these approaches are not very practical.)

3. Write items deliberately to elicit certain processes from students. After the items are written, ask five judges to independently classify the items according to major levels of the Taxonomy. (Two questions will have to be considered here: Do the judges have the same frame of reference ? Can some test items be solved by several process ?).

4. Select one "idea" in the content and construct six items covering the six processes. This kind of item construction will lend to definite dependency relationships among obtained scores. We should construct items covering various "ideas".

5. Let us consider the format of the "product" response measure. In other words we are now concerned about the type of items to be used. If we construct objective tests (say, multiple-choice items), the problem of objective scoring will be solved. There is a fear that the subjects can "work backwards" in multiple-choice items, and in that case other processes come into play in place of the processes we had anticipated.

It is likely that writing items for Synthesis and Evaluation in multiple-choice format proves almost impossible. Regarding Evaluation the authors say,

> the types of evaluation discussed here are not frequently used in secondary or collegiate examinations. . . Perhaps the greatest value of the Taxonomy. . . is in pointing to the need . . . of testing techniques for measuring competence in evaluating documents, material and works. (Bloom, et. al., 1956, p. 195.)

For the time being the free-response format will have to be used. In that case, analysis of multiple types of responses will have to be done.

Because the Synthesis and Evaluation processes are critically important and because of the nearly predictable unacceptance of survey instruments which include free-response items, it seems especially appropriate to conduct research on item writing techniques and formats which might make these processes amenable to multiple-choice assessment.

6. Collect verbalizations from the subject while he is solving the item. This can be done by asking the subject to verbalize (before a microphone) while solving the problem so that his thinking can be

recorded. This "thinking aloud" technique of collecting data is time-consuming but can be tried This will give us the process response measure.

7. Appoint judges—well-trained and with high inter-rater reliability—to determine whether in fact the subject's thinking manifests the cognitive process expected on a particular item.

8. Select and use appropriate statistical methods to analyse the results.

The following characteristics (in results) are expected:

1. The mean scores on the categories should decrease as the complexity of the category increases. (If some category does not fit in, we might conclude that that category is misplaced.)

2. Appropriate analysis of the intercorrelation matrix of category scores should reveal simplical structure as described in the Guttman Radex Technique. (According to Guttman's simplex theory, if a group of tests differ only in complexity, then

$$r_{ik} = r_{ij} \; r_{jk} \text{ where } i < j > k.$$

Adjacent categories of the Taxonomy should be more highly correlated than non-adjacent pairs of categories and the correlations should decrease as the distance between categories increases

3. Factor analysis of the intercorrelation matrix should reveal a structure consisting of a unique factor loading only on the evaluation subtests, a general factor, and four group factors which might be named Comprehension, Application, Analysis and Synthesis.

PRACTICAL IMPLICATIONS OF THE RESEARCH

Suppose that as a result of this research and subsequent large-scale research we have been able to prove that the arrangement of categories of cognitive processes *is* hierarchical and that the hierarchy is cumulative. In that case the following will be the practical implications.

1. We will be able to build batteries of tests having Taxonomy-type tests.

2. With the help of factor analysis we will be able to determine how each subtest (corresponding to processes) loads on intelligence tests.

3. Perhaps we will be able to develop regression equations (involving the processes) for efficiency required in various kinds of jobs.

4 Perhaps we will be able to develop a battery of tests based on the Taxonomy that can work as a screening instrument for college entrance. This battery may perform the same type of functions as the Graduate Record Examination and the Miller Analogies Test do.

5. Investigations might be taken to determine if the upper levels of the Taxonomy are more highly related to standard measures of creativity than are mental ability scores related to such measures.

6. Investigations might be taken to determine the relation between Taxonomy-type test performance and intelligence, and reasoning ability; and to determine if students whose scores are not consistent with the cumulative hypothesis differ in intelligence and reasoning ability from students whose scores are consistent.

7. Investigations might be taken to determine if "successful" teachers could be discriminated from unsuccessful teachers on the basis of upper levels of the Taxonomy when intelligence is held constant.

8. Future research which makes use of the Taxonomy may reveal some of the psychological relations among the different classes of objectives and the extent to which transfer and retention differ among the major types of objectives.

9. It would provide a sound basis to develop sequential educational programmes intended for the systematic development of increasingly more complex objectives.

10. It would provide a novel theoretical framework to consider certain educational problems; for example, educational underachievement could be explainable on the basis of cognitive disability.

11. If it can be demonstrated that each succeeding level of the Taxonomy is explainable by an increasingly larger set of aptitudes, then a new research avenue will be opened which might lead to the deliberate development of broad aptitudes and perhaps the experimental creation, through novel instructional programmes, of aptitudes which have not yet been identified.

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Incorporation by Students of Teachers' Values : A Study of the Student-Teacher Relationship

Ramesh C. Dixit
Deo Dutt Sharma

The authors discuss a study undertaken to examine the student-teacher relationship in terms of value incorporation. The Allport-Vernon scale of values was administered to 100 university students and their teachers. The authors report that the male teachers significantly differed from female teachers on religious value. The male students differed significantly from female students on theoretical aesthetic economic and political values. Other interesting sex differences are also reported. The data have been interpreted in terms of value incorporation.

One of the more significant psychological developments of contemporary Indian society would appear to be the relatively fluid state of the teacher-student relationship. Within a single generation, significant changes have taken place in the traditional conceptions of what is the teacher's role and what is the student's. Whether such changes have been abrupt enough to be considered a cultural revolution or sufficiently gradual to be simply degrees of cultural variation is difficult to judge. In either case, however, this changed and changing cultural pattern has a number of implications and possible effects that bear directly on individual, group and institutional behaviours. In this connection such questions as the following might be asked: What are some of these changes of values that have taken place in the teacher-student relationship? Have such changes been more pronounced in the students than in the teachers? How have these changes affected the life adjustment? What about the effect on students and teachers at the present time and in the years ahead? These are just a few of the problems in the area of the student-teacher relationship and value adjustment that need to be studied and investigated.

It is usually assumed that what goes on among students in a classroom is dependent to a major degree upon the presence of a teacher—a teacher whose role is to provide leadership in 'learning' activities at which the students themselves are initiates, unprepared without assistance to determine appropriate goals or to select and employ suitable ways and means of attaining such goals. The teacher, by virtue of education and experience, is expected to be able to guide and assist his students in the acquisition of usable knowledge, group approved attitudes and value systems.

Qualitatively, at least, the logic of this argument appears sound, i.e., the student's values are a function of the teacher's values, the teacher being a necessary, though not sufficient, condition for purposeful and productive student performance. This phenomenon is referred to as 'value incorporation' which is based upon the teacher's ability to command desired goal-states of the student. The student's assimilation of the teacher's values in his self-ideals would be related to his self-conceptualization and social adjustment.

The present paper is primarily directed toward a study of the student-teacher relationship in terms of value incorporation.

METHOD

Subject

A sample of 100 subjects was randomly selected from the University of Jodhpur, Jodhpur. The sample consisted of 50 students (25 male and 25 female) and 50 teachers (25 male and 25 female). Their average age was 21.6, 19.8, 38.48 and 29.16 years, respectively. The only restriction placed upon the population was that they should have been attending the University for more than a year. Freshmen were excluded.

There were no statistically significant differences between the students (male and female) and teachers (male and female) in terms of patterns of geographical origin, family religious orientation, extra-curricular activities and the faculty (Arts, Science and Commerce) of their study.

Procedure

For measuring values, a scale of values, developed by Bhatnagar 1963 in Hindi, on the lines of Allport-Vernon-Lindzey scale of values, was used. The scale, as reported, is not an adaptation of the Allport-Vernon-Lindzey scale in Hindi as almost all the items are constructed afresh. The phychological content of the scale, however, remains the same in the sense that all the items measure the same six values in the same order. The test has firstly been tried on fifty students to check the language content of test. The split-half reliabilities which were found are: theoretical=.71, aesthetic=.64, economic=1.718, social=.60 political=.76, religious=.65. The validity of the scale has been computed by only one method, i.e., by correlating individual items with the total score on each respective value-scale.

The scale was administered individually and in the group on students and teachers. Each of the subjects took about 50 to 55 minutes time to complete the test. Special care was taken to keep uniformity in giving the instructions.

RESULTS

Although a review of pertinent literature by Tancock (1960) has suggested that boys and girls in a society undergo different experiences in

TABLE 1

Mean differences in the scores obtained on six values by the University male teachers and the University female teachers (N=50)

VALUES	THEORETICAL		RELIGIOUS		SOCIAL		AESTHETIC		ECONOMIC		POLITICAL	
	Male Teacher	*Female Teacher*	*Male Teacher*	*Female Teacher*	*Male Teacher*	*Female Teacher*	*Male Teacher*	*Female Teacher*	*Male Teacher*	*Female Teacher*	*Male Teacher*	*Female Teacher*
Mean	45·12	45·80	38·88	32·44	44·88	43·08	36·80	41·08	41·16	44·12	33·48	33·72
S.D.	6·05	4·68	8·42	7·85	5·70	5·59	7·85	7·76	6·64	5·09	4·39	6·48
C.R.	0·43		2·79**		1·106		1·90		1·73		0·15	

** Significant beyond ·01 level

TABLE 2

Mean differences in the scores obtained on six values by the University boys and University girls (N=50)

VALUES	T		R		S		A		E		P	
	Boys	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*	*Boys*	*Girls*
Mean	45·56	40·84	36·36	36·95	45·12	46·88	36 40	40·88	38·60	41·76	39·84	32·40
S.D.	3·73	3·22	8·5	8·72	6·24	5·6	7·5	7·75	5·55	5·02	5·0	5·6
C.R.	4·79***		0·23		1·03		2·113*		2·112*		4·89***	

* Significant beyond ·05 level

*** Significant beyond ·001 level

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TABLE 3

Mean differences in the scores obtained on six values by the University girls and University female teachers (N=50)

VALUES	T		R		S		A		E		P	
	Girls	*Female Teacher*	*Girls*	*Female Teacher*	*Girls*	*Female Teacher*	*Girls*	*Female Teacher*	*Girls*	*Female Teacher*	*Girls*	*Female Teacher*
Mean	40·84	45·80	36·95	32·44	46·88	43·08	40·88	41·00	41·76	44·12	32·40	33·72
S.D.	3·22	4·68	8 72	7·85	5·6	5·59	7·75	7·76	5·02	5·09	5·6	6·48
C.R.	4·36***		1·90		2·41*		0·05		1·64		0·70	

*Significant beyond ·05 level

***Significant beyond ·001 level

TABLE 4

Mean differences in the scores obtained on six values by the University girls and University male teachers (N=50)

VALUES	T		R		S		A		E		P	
	Girls	*Male Teacher*	*Girls*	*Male Teacher*	*Girls*	*Male Teacher*	*Girls*	*Male Teacher*	*Girls*	*Male Teacher*	*Girls*	*Male Teacher*
Mean	40·84	45·12	36·95	38·88	46·88	44·88	40·88	36·80	41·76	41·16	32·40	33·48
S.D.	3·22	6·05	8·72	8·42	5·6	5·70	7·75	7·85	5·02	6·64	5·6	4·39
C.R.	3·12**		0·796		1·25		1·89		0 36		0·75	

**Significant at .01 level

socialization, there were only few values for which the sex of the respondent made any difference. Out of the six values, the male teachers have scored high on the religious value and have differed significantly ($p < .01$) from the female teachers.

Much more significant differences have been found in between the male and female students, than the teachers. The boys have, interestingly, scored high on theoretical ($p < .001$) and political values ($p < 0.01$) and girls have surpassed them on aesthetic ($p < .05$) and economic values ($p < .05$).

These sex differences have a considerable importance from the point of view of experiences in socialization. In India the boys are given a great deal of freedom to take an active part in politics and girls are generally inhibited from taking any interest in outdoor activities.

Table 3 shows the differences in values between the girl students and their female teachers. The female teachers have scored significantly higher on theoretical value ($p < .001$) than their female students, while the female students scored higher on social value than their female teachers. Modern education seems to have made a considrable impact upon the girl students and has changed their values, whereas their female teachers remained unaffected. Thus, on theoretical and religious values both differ significantly.

Girls, as compared with their male teachers showed significant differences on theoretical value ($p < .06$). As seen in Table 4, the male teachers like the female ones, have scored higher on this value than the girls. Interestingly, the boys too have scored high on this value. As such University girls have shown no dominant interest in the 'discovery of truth'. They are less empirical, less critical, and less rational in their approach.

The boys have differed significantly from their female teachers on aesthetic, economic and political values They were scoring higher on political values than the female teachers, and the female teachers scored higher on aesthetic and economic values than the male students. Examining Tables 4 and 5, it cannot be said that the opposite-sex situation facilitates the process of value incorporation.

The male students as compared with the male teachers indicated (Table 6) significant differences on political value. $p < .001$. There again, the male students were scoring much higher than their male teachers.

To summarize, the following results were obtained:

1. Male teachers differed significantly ($p < .01$) on religious value from the female teachers.

2. The male students differed significantly from the female students on theoretical value ($p < .001$), political values ($p < .001$) and aesthetic and economic values ($p < .05$).

3. The female students differed significantly from their female teachers on theoretical value ($p < .001$) and social value ($p < .05$).

4. Singnificant differences were found between the male teachers and girls on theoretical value ($p < .01$).

5. The male students differed from their female teachers on aesthetic, economic and political values.

6. The male students differed significantly from their male teachers on political value ($p < .001$) only.

DISCUSSION

The differences in value in between the boys and girls are difficult to explain in terms of any curricular differences between the sexes. Females, on the whole, tend to be more oriented to conformity and sociability—to doing things to please others. Because of their close attachment to a group, because of their initial personality disposition, and because they are more open-minded and receptive to new ideas than males, it is quite conceivable that females will be influenced or affected to a greater degree than males by the mores and demands of the peer group as well as of the teachers.

Males are less traditional-value oriented and more political-value oriented. In other words, they are less inner-directed and more outer-directed. They are less absolute in their moral, religious and ethical values leading to less respect for law, rules and regulations and a less optimistic outlook for their future. They have, however, developed greater interest in political matters and social issues.

The fact of the students scoring higher on the political value than their teachers may be explained in terms of their pre-adult socialization. Most of these students were born during 1947, the year India achieved political independence. Linton (1945) holds that an individual's values are intimately related to his previous experience, particularly the experinces he has undergone earlier in life during the process of socialization within the family.

The University teachers have scored higher on theoretical value and the girls have scored higher on social value than their teachers. These two values are opposed to each other. The young college-going girls are more enthusiastic to adopt new values because they are more restless than boys are to attain equal status with men and "participate with them in social affairs". They care more for the "love of people" than the "love of truth" the point on which their male and female teachers differ from them. University teachers see their highest values in form and harmony and have a dominant interest in the discovery of truth. They have more of social restraint and self-control, which incorporates the basic Indian outlook that a teacher must have.

The most dominant value in University boys is political value, as in the case of girls it is the social one. This sort of situation can be explained on the basis of University boys wanting more opportunities for interacting with the Government which has failed to provide jobs to many educated young men. Thus it might be the feeling of economic insecurity and uncertainty that

TABLE 5

Mean differences in the scores obtained on six values by the University boys and University female teachers (N= 50)

	T		R		S		A		E		P	
	Boys	*Female Teacher*	*Boys*	*Female Teacher*	*Boys*	*Female Teacher*	*Boys*	*Female Teacher*	*Boys*	*Female Teacher*	*Boys*	*Female Teacher*
Mean	45·56	45·80	36·36	32·44	45·12	43·08	36·40	41·00	38·60	44·12	39·84	33·72
S.D.	3·73	4·68	8·5	7·85	6·24	5·59	7·5	7·76	5·55	5·09	5·0	6·48
C.R.	0·79		1·69		1·22		2·82**		3·66**		3·74**	

**Significant at ·01 level

TABLE 6

Mean differences in the scores obtained on six values by the University boys and University male teachers (N=50)

Values	T		R		S		A		E		P	
	Boys	*Male Teacher*	*Boys*	*Male Teacher*	*Boys*	*Male Teacher*	*Boys*	*Male Teacher*	*Boys*	*Male Teacher*	*Boys*	*Male Teacher*
Mean	45·56	45·12	36·36	38·88	45·12	44·88	36·40	36·80	38·60	41·16	39·84	33·48
S.D.	3·73	6·05	8·5	8·42	6·24	5·70	7·5	7·85	5·55	6·64	5·0	4·39
C.R.	0·303		1·03		0·13		0·18		1·47		4·75***	

***Significant beyond ·001 level

motivates them to treat politics as a "side business" to their education. However, further research would be needed to prove the hypothesis that the political value among University male students is a function of economic insecurity and uncertainty regarding jobs.

The theoretical position emphasizing "incorporation" in which the values are accepted on the basis of their "objective capacity to enhance ego-status without forming any emotional tie" to the model, would predict a great deal of the student-teacher relationship in terms of values. Thus the data provide partial confirmation for this theoretical position.

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Relationship between Old (1956) and New (1966) Norms for Goodenough's Draw-a-Man Test (Pramila Pathak's Indian Adaptation) on Normal and Retarded Children[1]

S. K. Majumdar

While dealing with children in the child clinic at B. M. Institute, Ahmedabad, the author found that the revised (1966) norms of Pramila Pathak's Indian Adaptation of Goodenough's Draw-a-Man Test yielded higher I.Q.'s with retarded children than the old (1956) norms. To investigate this the author conducted the study discussed in this paper. He found that for retarded children the new norms give significantly higher I.Q.'s than the old norms, but for normal children the difference between the two norms is not statistically significant.

By now we have large number of intelligence tests. They may broadly be classified as verbal—non-verbal and group—individual. The Draw-A-Man Test is one of the non-verbal tests which can be administered in groups as well as individually. Goodenough (1926) has done sufficient work to prove its applicability in various fields of psychological interest. She emphasized that with age, the skill of drawing the human figure also increases, and she found a significant relationship between drawing development and intellectual maturity. This test measures keenness of observation of children as revealed by their drawing of a man (Horniman, 1947). Here the subject is required to draw a full figure of a man as best as he can. The obtained drawing is scored with the help of scoring categories given by Goodenough. Separate scores are given for different body parts, their proportions and integrations.

In India, Pramila Pathak worked on the test and adapted it for our population. During the initial phase she published the instructions for scoring the Draw-A-Man Test and prepared the norms according to the age of the child (Pathak, 1956). The age ranged from 3 to 22 years with no

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[1] The author wishes to express his gratitude to the authorities of the B. M. Institute for giving permission to use the clinic data. He is also indebted to his seniors and colleageus for their suggestions and help, and to Mrs. Phanse, a school psychologist, for her help in data-collection for the normal sample.

separate norms for boys and girls. Later she published revised norms (Pathak 1966) reducing the age-range from 6 to 10 years (she has not given reasons for this) and considering the sex and the educational environment. Her total sample is not clear in the book. For each age-level she gives I.Q. range and its respective mean. To get a specific I.Q., one has to refer a table where raw scores and the chronological ages with the equivalent I.Q. are given. It is important to note than in Goodenough's norms, the age-range is wide enough to cover children from 3 to 13 years of age with respective raw scores and norms.

While dealing with children in the child psychiatric clinic at the B. M. Institute, the author has been using the Draw-a-Man Test which is a part of a clinical test battery along with other cognitive tests, and was using the old norms of Pramila Pathak (1956). With the introduction of the new norms (Pathak, 1966) it was considered feasible and appropriate to use the same under the assumption that this would be a more standardized version. During two years of experience with the revised norms the author felt that when they are used with retarded children they yield higher I Qs. than old norms, and which do not agree with the result of other well standardized cognitive tests, like Shukla's Intelligence Test[2], for the same group. Let us take a hypothetical example. Suppose a 10-year-old retarded boy who is living in a city where university education is available draws a round circle and two small circles for eyes and says "This is a man". He would get a raw score of 3, which, according to the new norms, would give him an I.Q. of 59 while the old norms would give him I.Q. of 30. Let us now take another example of a normal boy of 9 years 3 months, who draws a figure of a man and gets a raw score of twenty-nine. According to the old norms he will get an I.Q. of 116 while the new norms will give him an I.Q. of 118. This difference of 29 with retarded children and the difference of 2 with normal children required statistical investigation, to know whether the observed difference based on the new manual exists at group level or not. The present enquiry was conducted to answer the following questions:

1. Do the new norms for DAM Test give higher I.Q. than old norms?

2. Do the new norms give significantly higher I.Qs. for retarded children than for normal children?

3. If the answer to the second question is "yes", which of the norms is nearer to Shukla's Intelligence Test's I.Q. for the retarded children?

Sample

The sample consisted of 44 children, 22 "normal" and 22 "retarded" children. DAM protocols of retarded children were selected from the clinic cases, who were diagnosed as "Mentally Retarded" by a psychiatric team which included psychiatrists, phychologists, and psychiatric social workers. The age ranged from 6 years 2 months to 10 years, with a mean of 8.45=1.12 (sigma),

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[2] Shukla's Test is an adaptation of the Binet-Simon (1916) which is very old; but as we do not have any latest standardized version for Gujarati children, it was taken as a criterion for relating the DAM's two norms.

The protocols for normal children were drawn from one of the school project data. Care was taken to select a matched group with respect to age, as exactly as possible. The age range was 6 years 5 months to 10 years, with a mean age of 8.54=1.00 (sigma). The criterion for selecting normal group was that children should be studying in age-appropriate standards.

TABLE 1

Distribution of the Sample

Children	*Boys*	*Girls*	*Total*
Normal	15	7	22
Retarded	15	7	22
Total	30	14	44

Procedure

The DAM Test was administered to the sample as per instructions given by Pramila Pathak. Normal children were given this test in a group while retarded children were tested individually, along with other cognitive tests. All the protocols were scored with the help of the old and new manuals of Pramila Pathak, thereby getting two different I.Qs. for each subject of the sample.

The statistical test, i.e., F—test of Significance and correlations were performed on the collected data.

Results

Table 2 shows that the new norms definitely give significantly higher I.Q. by 23 05 points that the old norms, for retarded children. With normal children the new norms give higher I.Q. by 8.09 points than the old norms. This difference between two norms for normal children is not significant.

TABLE 2

Table showing Means, Standard Deviations of I.Q. Scores, and Differences between two Means of Normal and Retarded Children with reference to Old and New Norms

Group	*N*	OLD NORMS		NEW NORMS		*Difference between means*	*F, value*	*Level of significance*
		Mean	*SD*	*Mean*	*SD*			
Retarded	22	55·68	14·64	78·73	11·55	23·05	32·08	Beyond 0·01
Normal	22	107·86	25·07	116·95	16·29	8·09	1·92	No sign.

Table 3 shows the correlation between old and new norms for both the groups. The correlations between the old and the new manual is low and not significant for retarded children, while for normal children the correlation between the old and the new norms is highly significant. This indicates that for the retarded, the two norms give different results and the results are not statistically related. With normals, the results of the two norms are related and give approximately the same result; the observed difference was found to be by chance.

TABLE 3

Correlations between Old and New Norms for Retarded and Normal Children

			N	*r*	*C.R. between two r's*
Retarded	..	..	22	·36[1]	16·10[2]
Normal	..	..	22	·97[3]	

1. Not significant. 2. Significant at ·01 level. 3. Significant beyond ·01 level.

The answer to the question, 'Do the new norms give significantly higher I.Q. for retarded children than for normal children?' is 'Yes' (See Table 2). An attempt was made to relate the I.Qs. on both the norms with I.Qs. on Shukla's test for retarded children. Table 4 shows that the new norms give a higher I.Q. by 20.95 points than Shukla's-test I.Qs., for retarded children, which is highly significant, while the old norms give a higher I.Q. by only 2.20 points for the same children, which is not at all significant; this difference may be by chance.

TABLE 4

Table 4 (*a*), 4 (*b*) *showing F values and their Significance Levels Comparing the I.Q. Scores on Shukla's Test and DAM's Old and New Norms, on Retarded Children* (*N*=19)

(a)	*DAM Old Norms*	*Shukla's test scores*	*Difference between two Means*	*F value*
Mean	55·43	57·55	2·12	·44
S.D.	14·42	16·56		Not significant

(b)	*DAM New Norms*	*Shukla's test scores*	*Difference between two Means*	*F. value*
Mean	78·58	57·55	21·03	19·59 Significant
	11·30	16·56		beyond ·01 level

Discussion

As mentioned above, the results showed statistically significant difference between Pramila Pathak's old and new norms for Goodenough's Draw-A-Man Test, when used with retarded children. This needs explaining. While going through both old and new norms it became obvious that in the new norms Pramila Pathak is lenient and gives a higher I.Q. for low raw scores. A raw score of one which is rare, will give 61, 59, 58, 55 and 55 I.Q. to 6, 7, 8, 9 and 10 years' old boys respectively, while the old norms for raw score of one would not give any I.Q. level for mental age to 6 to 10 years. In the old norms a raw score of four is given to each age, and thereby 3 months to a raw score of one. In new norms the same I.Q. range and I.Q. are given for the whole range of chronological years. It is obvious that the old norms will give different I.Qs. for two boys of 7 years 2 months and 7 years 11 months for same raw score, while the new norm gives same I.Qs. for both.

It is not clear why Pramila Pathak revised her norms. The possible answer is that the 1958 version was a doctoral work and the 1966 norms were post-doctoral work in which she has included a wider range of subjects from various places in India. In the revised norms she has changed the whole method of calculating I.Q. for Draw-A-Man Test, (her old method resembled the original Goodenough's) for which no rationale was given (Pathak, 1966). Looking at the Table 2, one can see the insignificant difference in means between the two norms for normal children. The question arises: Is this true for a large sample? If so, then why the revision? What was the rationale for raising and changing the norms?*

The further attempt to relate both the norms to Shukla's Test performance for retarded children indicated that the old norms are much nearer to Shukla's I. Q. for the same group, and the difference between the old norms and I.Qs. on Shukla's Test was not significant. Shukla's Intelligence Test is an adaptation of the Standford-Binet (1916) Test which covers verbal and performance items. The age-range for the test is 3 to 22 years, with six sub-items at each age-level thereby giving two months to each sub-item. The old norms of Pramila Pathak and the original Goodenough's norms resemble Shukla's scoring system.

Although there are limitations to this study, for example a small sample, (to eliminate this limitation as far as possible care was taken to select matched groups as exactly as possible), and a difference in the methods of test administration for retarded and normal children, it can be tentatively concluded that it would be advisable to use the old norms with the retarded children while with normal school-going children new norms may be used.

The present author was fortunate to come across some protocols of superior children from which it was found that the new norms give a lower I.Q. by about 11 points (for 15 children, the Mean for the new norms was 125 and for the old norms was 136). Here the question came up why the new norms give higher I.Q. for retarded and lower I.Q. for superior children? This needs to be explained by further research.

Conclusions

The following conclusions were drawn from the study:

1. The new norms give significantly higher I.Qs. for retarded children than the old norms.

2. For normal children the difference between the two norms was not large and was found to be statistically insignificant.

3. For retarded children old norms are found nearer to the I.Qs. on Shukla's Test, while between the new norms and the I.Qs. on Shukla's Test the differnce was 23 points.

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*The Stanford-Binet was revised with the rationale that the level of intelligence for the population had gone up.

4. On the basis of the above-mentioned conclusion it would be advisable to use the old norms of Pramila Pathak's Draw-A-Man Test with clinic child population.

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The Nature and Format of the Test for Instruction

S. S. Kulkarni

Tests are generally identified with examinations and are considered somewhat external to the teaching-learning process itself. In this paper the author critically examines the various types of tests. He maintains that learning proceeds more effectively if evaluation is built into the teaching-learning process and describes how learning-set tests for instruction may be constructed.

There is a growing uneasiness among test constructors as well as teachers regarding the role of tests in education. In most present circumstances test results are used to compare a student's performance with that of other students to promote or demote him.

In other words, tests are identified with examinations and are considered somewhat external to the teaching-learning process itself. In the last decade or so, test, experts, particularly those working in the field of programmed learning, demonstrated that if evaluation is built into the teaching-learning process itself, learning proceeds more efficiently. Programmed Learning material, at every step a question is asked and the student learning through it is required to answer that question Usually some procedure is also designed to immediately confirm the rightness and wrongness of the student's answer. This procedure also enables a teacher to get evidence of the student's progress by looking at the series of answers which a particular student has given to the frames—steps in a given programmed material. While these attempts to include evaluation as part of instruction were going on in the world of psychometricians another controversy was developing. Some of the test constructors like Ebel (1962) suggested that the old procedures of constructing an achievement test wherein the discrimination indices obtained from a population of students to whom ultimately the test is to be administered, may not be the only way to design tests. He introduced the concept of a "content standard test". Glaser (1962) also introduced the concept of the criterion-referenced test as distinguished from the norm-referenced test. The conventional standardized tests are labelled by Glaser as norm-referenced tests. The old term "mastery test" comes close to the concept of the criterion-referenced test. The criterion-referenced test aims at reflecting the desirable behaviour which is a goal or criterion for a given training programme. The norm-referenced test on the other hand aims to assess the capability of an individual as compared with the performance of other individuals. It is likely that as a result of a given training programme all the students may get 100 per cent marks on the criterion-referenced test. The designer of a criterion-referenced test would not revise the items on the plea that the test is not discriminating among the student population undergoing a given training programme. The designer of a norm-referenced test would like to construct a test which discriminates among individuals and if a given test does not give such discrimination, he would revise the items, deliberately making them more difficult and/or easier to get a certain desirable curve, in most cases a normal probability curve.

Those who are interested in instruction, that is to say in arranging learning experiences in a manner to help students master the specified criterion behaviour, may not be interested in the discrimination *per se* within a group undergoing the training programme. If there is discrimination, that is to say, if some students are failing while only some students are getting high marks, they would like to revise the training programme so as to bring up the performance of those who are failing. Most teachers would like all of their students to master the criterion behaviour. In other words, teachers or designers of instructional strategies are not interested in discrimination *per se*. They are primarily interested in a test which will tell them whether their students have arrived at the criterion behaviour—which students have arrived at which step, where some of them have failed, etc.

Functions of a Test in the Context of Instruction

At this stage it would be desirable to consider the various functions of a test in which teachers and the designers of instructional material are interested. For brevity we shall use the term programmer to represent both these groups.

Evaluating the Effectiveness of Instructional Material

In the last decade not only those who prepared programmed learning material but even those who prepared instructional material for the new curriculum like P.S.S.C., thought it essential to collect evidence regarding whether their instructional material is helping students to achieve the criterion behaviour. Achievement tests, unit tests and such other measures are being prepared for this purpose. The results of these tests are fed back to the designers of instructional material so that they can revise the instructional sequence, illustrations, vocabulary, etc., in the instructional material. In Programmed Learning material a criterion test is an essential part of the instructional material. An item in such a test justifies its placement in the test not on the basis that it discriminates among students who are learning through that programme—but on the basis that it reflects the criterion behaviour specified by the designer of the instructional material. Theoretically it may turn out that all the students learning through that programme get all the items right or no student responds correctly to any item from the given test indicating the effectiveness or otherwise of the programme for the given population.

Diagnosis

A teacher using any instructional material, and also the designer of such instructional material, need a test for another reason. They would like to know not only whether or not students master the criterion behaviour but also to know where exactly the students are committing errors. This information would help the designer of instructional material improve his material at the specific step where such revision is necessary, from the standpoint of student learning. This information would help a teacher to supplement the instructional material. Such information can be provided by constructing a test in a manner in which a diagnostic test is constructed. A diagnostic test reflects not only the elements of final criterion behaviour but also the transitional behaviour, i.e., that behaviour which refers to the mediating concepts, the learning of which leads ultimately to the criterion behaviour. If a student cannot respond to items referring to these mediating concepts or transitional behaviour, the designer of the instructional material has to revise his material at that specific step or a teacher has to help the student to understand that mediating concept by providing some supplementary experiences.

Selecting Students for a Given Instructional Programme

All educationists agree that students differ in their background knowledge, rate of learning, etc., and therefore, if possible they would like to provide individualized instruction, geared to the needs of students. Fortunately in the present decade, programmes are being developed (both in the strict sense of the term of the Skinnerian and Crowderian variety as well as instructional material through language laboratories, films, etc.) which can provide individualized instruction. One of the facilities a teacher using such programmes would need is to have some tests which can help him take decisions regarding which particular student he can assign to a given programme. In other words each training programme should specify the behaviour which is assumed to be known by the students before they take up that programme and tests should accordingly be prepared to assess these pre-requisites. These tests could be administered to students and their individual score would tell us whether a given individual can be asked to go through a particular training programme or not.

What does this add up to? We need a test to assess: (a) Criterion behaviour (function 1); (b) Transitional behaviour (function 2); and (c) Initial behaviour (function 3). It could be one test consisting of subtests or a series of tests depending upon the number of items necessary to represent the universe of behaviour with adequate reliability and validity.

Ranking Students

Now let us consider the function of ranking students performed by the standardized achievement tests or the conventional achievement tests used in examinations, etc. It is true that a programmer is not primarily interested in ranking students who have taken his programme. He would ideally like to have all the students to achieve the criterion performance. But then the problem arises as to how does he know that a given test reflects that criterion behaviour reliably? One source of evidence is, of course, the subject matter expert looking at the tests and saying that the items in this test reflect the criterion behaviour. But then the whole history of measurement suggests that the subject matter expert's opinion regarding the reliability and validity of an item is not adequate evidence. An item may look good and still a person who is an acknowledged expert in a field may not be able to solve it correctly, while a novice may respond to it correctly. Here we get into the techniques of constructing items. The procedure of item analysis—computing item difficulty and discrimination indices, etc., are developed to get additional evidence to see whether an item works in the right direction. The problem faced by a programmer that an item may not discriminate among students who are taught by a given programme could be solved by a slight change in the procedure of collecting the item statistics. Ebel (1962) has suggested, in the context of constructing classroom tests, a procedure which may be of help in this context also. Following this procedure a test constructor in the try-out phase may give his test to a group consisting of experts, trainees who have taken the programme, and novices who have not taken the programme but who can be matched with the trainees on all the important variables except the training in consideration. No programmer should deny that an item in the test reflecting the criterion behaviour should be responded to correctly by all the experts. The novices on the other hand should not be able to get more than 40 per cent of the criterion items. In case the novices are getting more than 40 per cent of the items it implies that the programme which aims to teach some new criterion behaviour is not teaching something which the trainees do not already know. A group of experts, trainees and novices ranging widely in their achievement would help in collecting item statistics which will allow item analysis in the conventional sense. (Of course there is nothing sacred in the figure 40 per cent. Any other, preferably stricter, standard could be fixed.) In short although the ranking of students may not be the main function of a test to be used in the programmed learning context the data regarding discrimination between the experts, trainees and novices would help in constructing a reliable and valid test without sacrificing the functions 1, 2 and 3, referred to above.

3. NATURE OF A LEARNING SET TEST

Is it necessary then to construct tests separately for assessing the criterion behaviour, transitional behaviour and initial behaviour respectively? It seems to me that constructing a test/tests which can perform all the three functions mentioned above, would save a lot of time and cost if the task is taken up simultaneously. Programmed material usually, although not always, represents a certain hierarchy. A programmer takes a student from specified initial behaviour to the criterion behaviour through certain mediating concepts or transitional behaviour. A programmer worth the name has to prepare to task analysis or a flow chart whatever the name may be, reflecting the initial behaviour, the transitional behaviour and the criterion behaviour. By the time a programmer finishes writing a programme, he has a clear map of the whole hierarchy or sequence that he has built in the programme. In most programmed learning materials there are also what are called criterion frames. Criterion frames may be defined as frames within a programme which are minimally cued (prompted) and the correct response to which is considered by a programmer as learning (or mastery) of a sub-task or unit he was trying to teach in the sequence prior to such a criterion frame. Of course, in most programmes, especially those following the Skinerian technique, the error-rate is very low even on the criterion frames. But all the same such a frame is more or less equivalent to a test item. The error-rate or, in psychometric terms, the difficulty value of such a criterion frame is low because care is taken to see that students learn the sub-task through the learning frames preceding it.

A test constructor usually has to spend a lot of time in preparing a table of specifications. On the other hand, a programmer has no escape but to prepare a task analysis. The task analysis prepared by a programmer can easily be transformed in the hands of a test constructor into a table of specifications. He can then independently write items to represent all the three phases: the initial, the transitional and the criterion behaviour. Such a test may be called a learning-set test. Gange (1961) defines a learning set as "knowledge relevant to any given final task to be learned. These are considered to be arranged in a hierarchy such that any learning set may have one or more learning sets subordinate to it in the sense that they mediate positive transfer to the given learning set. These subordinate sets in turn have other learning sets subordinate to them and so on."

Such a learning set test can perform all the three functions referred to above. It is, of course, a criterion-referenced test. It is also, in a sense, a norm-referenced test, i.e., it can discriminate between experts and trainees on the one hand and novices on the other.

An additional advantage of a learning-set test is that it allows a re-appraisal of the sequence in a given programme. In most programmes, there is an assumed hierarchy of learning sets. The pre-conceived hierarchy goes through some modifications during the try-out of a programme. But even then the try-out itself is somewhat biased to the sequence pre-conceived by a programmer unless of course a programme is built completely in a learner controlled manner as suggested by Mager (1961). How does one know whether a sequence built in the programme is the necessary sequence? How does one know whether a concept—a sub-learning set is essential or otherwise for another supposedly higher learning set? One method to test this is to administer a learning-set test to students after they have gone through a programme, and also to the novices On the basis of the scores obtained by students, one can prepare an item-by-individual scalogram. (See Appendix 3.) The rationale and the procedure of constructing this scalogram is basically the same as proposed by Guttman (1947). The basic assumption is that a student getting a lower score would not be getting correct items representing higher concepts. The co-efficient of reproducability will then be an index of a perfect sequence in the programme. If on the other hand there are inversions meaning thereby that some students are getting items on the higher concepts correct without getting the items on the lower concept, it will mean that the sequence is not perfect. It may turn out that some of the learning sets which are put later in the programme are easier or can be taught earlier or may not be taught at all.

The Scalogram reproduced in the Appendix 3 is based on the post-test scores obtained by students who have gone through a programme on "Earth Rotation and Revolution" in an experiment conducted by Sharma and Kulkarni (1967). The X-axis give items in the post tests arranged in an order representing the sequence/hierarchy in the programme. The Y-axis represents students selected randomly from each score interval of three. The range of scores obtained on the post-test was twenty to forty-eight. The scalogram suggests that the hierarchy in parts A, B, C, D is empirically *justifiable. But as regards the sequence of part D and part E, some reconsi*deration is necessary. In this particular programme, part D deals with the topic of latitudes and part E with the topic on longitudes. There is no logical or psychological necessity of teaching latitude prior to longitude. This is what is indicated by the empirical data as presented in the scalogram. Various other inversions may also be studied by a programmer/subject matter expert for more hints in revising the organization of the programme.

From a teacher's point of view, too, such a scalogram analysis of post-test items would be enlightening. He would be able to locate students who need help and the exact step to which they require such help. He could then provide them remedial material or arrange for individual instruction.

4. DISTINCTION BETWEEN LEARNING SET TEST AND STANDARDIZED ACHIEVEMENT TEST

The conventional procedure of constructing an achievement test does not give enough importance to the transitional behaviour and to the initial behaviour. It focuses more on the criterion behaviour—the final product of the educational treatment. Diagnostic tests on the other hand take into consideration the transitional behaviour. As such, the conventionally prepared standardized achievement test cannot perform the second and third functions referred to above namely diagnosis and selecting students for a training programme. In evaluating programmed material also standardized achievement tests suffer from some limitations. Such a test may have certain elements which are not included as goals for a particular programme or it may not have certain elements which a certain programmer is including as goals for the specific programme. In other words, a given standardized achievement test may not be representing fully or adequately the criterion behaviour which a given programme is aiming at.

A standardized achievement test also suffers from another limitation when it is used in a search of pre- and post-test design. Most programmers would like to know where a student stands before he takes the programme, so that the gain in his learning after he goes through the programme can be measured. The conventional standardized achievement test, as stated above, may not contain items on the pre-requisite knowledge and skills, and, therefore, when it is administered as a pre-test the variations within a group at the starting point may not come out. On the other hand, if a learning set test is administered which has items representing the initial behaviour, it can allow a teacher/a programmer to note the variations in the starting point of different individuals. This will allow a teacher or a programmer to help students if and where necessary or to allow a student to omit certain sections of a programme if he has already mastered the behaviour referred to in those sections.

Items representing the initial behaviour in a test which is to be administered as a pre-test also help in another very important way. If a test has items representing only the criterion behaviour but not the initial behaviour, the likelihood is high that students would not get any items correct and thereby would get frustrated. On the other hand, a learning set test, by having items representing the initial behaviour, allows a student to demonstrate what he does know and hereby gives him a feeling of satisfaction and confidence.

The sequential test idea as exemplified by the Sequential Test of Educational Progress by Educational Testing Service goes a long way in this important direction. But most achievement tests commercially available are not developed on the sequential model.

5. Distinction Between Learning-Set Test and Criterion Frames Within a Programme: the Problem of Transfer

As noted above, most programmes have criterion or sub-criterion frames spread out within them. If one separates such frames from a programme and modifies them wherever necessary, one can develop a test. Some programmers suggest that there is no need of developing separate tests because there is a test in the form of criterion frames built in a programme itself. Here the important issue is that of transfer of learning. A programme may be teaching students certain behaviour but this behaviour may be too specific. Even when one accepts the act that criterion frames within a programme are minimally prompted or cued, sequence itself is an important prompt. Then again even if one separates these frames from a programme and administers them by mixing up the order, one does not really solve the limitation of specificity. Independent evidence must be obtained before one concludes that students have arrived at the criterion behaviour. The criterion frames in a programme constitute only one sample of the population of items which can be generated out of the defined criterion behaviour. Can trainees of a given programme solve items from another sample of a population of items based on the same definition of criterion behaviour? This is a relevant and important question, and unless it is answered satisfactorily by an independent evidence, one cannot feel assured with the effectiveness of a programme

It is true, however, that it is not easy to generate complete population of items for a defined criterion behaviour, and then to draw item samples randomly. Operationally then what it amounts to is to get items constructed by an independent competent person who works on the basis of the same definition of criterion behaviour or table of specification. In the context of programmed learning, one may arrange the operations as follows. The task analysis representing the initial, transitional and criterion behaviour of a programme should be given to a test constructor other than the programmer. This test constructor(s) should write items to represent the various specified behaviours. In other words, a learning set test should be prepared.

Of course, the point remains whether schools would agree with the criterion behaviour. But this is a separate question. A programmer may first ask the schools to define the criterion behaviour and then prepare a programme to arrive at that criterion behavour. Schools can also satisfy themselves as regards the representiveness of a learning set test, that is to say whether test reflects the desirable learning.

The Problem of Transfer

The problem of transfer from one sample of items to another is only one dimension of the concept of transfer. The transfer of learning can also be considered on various other dimensions like situation, complexity of elements, etc. To what extent a programme enables a student to transfer his learning to these various dimensions is a problem which will always be posed, but which is not easy to solve. The major difficulty here is to define in operational terms the extent of transfer on these various dimensions. Programmers claim that if the degree of transfer—its specific nature (its dimension) is defined by the consumer in operational terms, they may be able to programme for it. There are now programmes which enable children to get higher scores on intelligence tests. The present writer does not wish to enter into this field in this paper. He only wants to point out here that to the extent the degree of the transfer is defined in operational terms, it can be transferred into a pool of test items. Such test items should form a part of the learning set test referred to above. One may also like to assess the criterion behaviour under different conditions like immediate *versus* delayed retention, recognition *versus* recall, etc. In all such circumstances, learning set tests, as defined above, could be useful.

Conclusion

It is not the contention of this paper that a learning set test must be one test without parts. In fact, it would be advisable to arrange a learning-set test in parts, the first part reflecting the initial behaviour, the second part representing the transitional behaviour, and the third part representing the criterion behaviour. What is emphasised however, is that while constructing a test, one should have a complete analysis of all these three phases and construct items to represent this total universe of behaviour. It may also be pointed out here that within a given part the items need not be presented to the students in sequential order. They should preferably be presented in a random order. For the purposes of the scalogram referred to above they could however be rearranged when necessary to represent the hierarchy in the programme.

the scalogram referred to above they could however be rearranged when necessary to represent the hierarchy in the programme.

It may also be noted that a test designed on the learning set model referred to above and for which item analysis data are collected by the procedure suggested by Ebel (1962) would not only be helpful in the context of Porogrammed Learning in the strict sense but also for other instructional materials which aim at getting empirical proof for justifying their effectiveness. No teacher or designer of instructional material should consider tests as external to the teaching learning process. Tests should become a part and parcel of the instructional process because evaluation and feedback based on it are crucial elements of the teaching learning process itself.

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APPENDIX

ANALYSIS OF

Sequential Progression of the Programme on Sequential Order of the Post-Test Items

PART		A							B						C						
ITEM NO.		6	5	4	2	44	3	1	10	7	9	16	12	11	24	34	38	39	40	15	8
S. NO.	SCORES																				
1.	48																				
2.	45																				
3.	42																				
4.	38															x					
5.	36														x	x				x	
6.	34																		x		
7	32							x													
8.	28						x	x													
9.	25							x				x									x
10.	22							x					x	x							x
11.	20							x						x						x	x

A = Shape of Earth and Sun

B = Earth's movements

C = North and South Poles

D = Latitudes

I

Post Test Scores

"Earth's Rotation and Revolution"

in Each Part of the Programme

D																	E										
13	46	17	43	28	41	25	26	27	23	21	18	20	19	29	30	22	36	37	35	48	47	14	32	33	42	31	49
																										X	X
					X	X																			X	X	X
					X	X											X	X	X						X	X	X
		X						X				X			X	X	X	X	X						X	X	X
						X	X	X						X	X	X	X	X		X					X	X	X
		X										X	X	X	X	X	X	X		X	X		X	X	X	X	X
						X	X	X	X	X	X	X	X	X	X	X					X		X	X	X	X	X
		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							X	X	X	X	X
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X

X = Incorrect Response

Items 31 and 49 refer to topic on International Dateline taught at the end of part E.

Assessment of Educational Levels of Different Geographical Areas

J. D. Kale

The percentage of literacy is the simplest measure for judging the educational level of any place. This is however, a crude measure for it does not really bring out the differences in educational levels. In this paper, the author reports his attempt to apply the scaling technique to compare the educational levels of six cities of Gujarat State. He finds that an index of education, constructed by the repeated scaling method, gives a sharp discriminating power.

In census data we come across classification of population of age above 5 years according to the levels of education. Persons of a certain area are classified mainly into two broad groups: Illiterate and Literate. Thus a common measure of assessing educational attainment is the percentage of literacy.

Thus the information collected on different levels of education is not made use of in comparing two areas. This information can, however, be measured quantitatively if the scaling technique is adopted. Use of the scaling technique is attempted below in studying the educational levels of six cities of Gujarat State.

Methodology

Information regarding educational attainment collected in the census is grouped in the following classes: (1) Illiterate, (2) Literate, (3) Primary, (4) Secondary (Matriculation), (5) Higher (Graduation), (6) Above Graduation, and (7) Unspecified.

Unweighted Standard Scores

In adopting the scaling technique, every class is viewed as a test in education. The percentage of population of an area in each class is taken as a score of that area in a specified test. These scores are raw scores. These raw scores are converted into standard scores with Mean=100 and Standard Deviation=10.

Weighted Standard Scores

Unweighted standard scores arrived at as above do not take into consideration the length of schooling. If the length of schooling is presumed as a weight of a particular test, weighted standard scores will be obtained. These weighted standard scores are more realistic due to the fact that they take care of different types of education.

Repeated Scaling Method

Another approach to measure educational levels of areas is to construct an index of educational level. This index is constructed by using repeated scaling method.

In this method each level of education is assumed as a separate entity. An individual may possess any one of these entities or he may have more than one type of education-characteristic. Thus, a post-graduate will be a "literate", a "primary educated", a "secondary educated", a "graduate" and a "post-graduate".

Data

Data collected in the 1966 sample survey is used in computing measurement of education of six cities (each having a population of more than one lakh) in Gujarat State. The cities are: (1), Ahmedabad, (2) Baroda, (3) Bhavnagar, (4) Jamnagar, (5) Rajkot and (6) Surat.

Results

Table 1 gives percentage distribution of population (over 5 years age) of the six cities according to educational classification.

TABLE 1

Percentage Distribution of Population (over 5 years age) according to Education

City	*Illiterate*	*Literate*	*Primary*	*Matriculate*	*Graduate*	*Above Graduate*	*Unspecified*	*Total*
Ahmedabad	29·36	10·00	42·02	11·86	4 19	2·32	0·25	100
Baroda	16·38	8·24	43·41	12·77	13·43	5·01	0·76	100
Bhavnagar	19·80	16·09	33·64	13·38	6·29	0·80	0·00	100
Jamnagar	57·13	0·03	32·65	6·30	3·41	0·34	0·14	100
Rajkot	41·49	5·20	40·18	8·86	3·19	0·66	0·42	100
Surat	24·47	22·61	27·61	11·95	10·22	2·06	1·03	100

Table 2 is reproduced from Table 1 by omitting the colum of "Illiterate". To that extent, the column of "Total" will be changed giving thereby the percentage literacy of each city. Two additional rows giving Mean and Standard Deviation of each column are computed in Table 2.

TABLE 2

Percentage Literacy, Mean and Standard Deviation

City	*Literate*	*Primary*	*Matriculate*	*Graduate*	*Above Graduate*	*Unspecified*	*Total*
Ahmedabad	10·00	42·02	11·86	4·19	2·32	0·25	70·64
Baroda	8·24	43·41	12·77	13·43	5·01	0·76	83·62
Bhavnagar	16·09	33·64	13·38	6·29	0·80	0·00	70·20
Jamnagar	0·03	32·65	6·30	3·41	0·34	0·14	42·87
Rajkot	5·20	40·18	8·86	3·19	0·66	0·42	58·51
Surat	22·61	27·61	11·95	10·22	2·06	1·08	75·53
Mean	10·26	36·59	10·85	6·79	1·86	0·44	66·90
Standard deviation	7·32	5·68	2·48	3·66	1·58	0·37	13·09

The body of Table 2 gives raw scores of each city in different tests of education, the last column of Total giving the total raw score of each city.

These raw scores are now converted into standard scores with Mean=100 and Standard Deviation=10, for each test. Table 3 gives these standard scores. The last column of Table 3 shows total standard score of each city in education. These scores are of course unweighted.

A comparison of Tables 2 and 3 shows that while in Table 2 each test has different Mean and Standard Deviation, in Table 3 the data is standarized by fixing the same Mean and Standard Deviation for each test. This standardization has helped in enlarging the differences of educational attainment of the cities as seen in the following.

TABLE 3

Standard Scores of Each City on the Basis of Levels of Education

City	*Literate*	*Primary*	*Matriculate*	*Graduate*	*Above Graduate*	*Un-specified*	*Total Standard Score*
Ahmedabad	99	109	104	93	103	95	603
Baroda	97	111	108	121	120	108	665
Bhavnagar	108	95	110	98	93	88	592
Jamnagar	86	93	82	91	90	92	434
Rajkot	93	106	92	90	92	99	472
Surat	117	85	105	109	101	117	634
Mean	100	100	100	100	100	100	100
Standard deviation	10	10	10	10	10	10	600 24·49

In Table 2, the difference in raw scores of Baroda and Jamnagar cities is of the magnitude of 35 distance while in Table 3 this difference (in standard scores) is of the magnitude of 45 distance.

The sensitivity of the two methods can be measured by the coefficient of variation; the smaller the coefficient of variation the higher the sensitivity. In Table 2 (of raw scores) the coefficient of variation (=Standard Deviation ÷ Mean is 0.195 while in Table 3 (of standard scores), it is 0.0408.

In Table 3 while calculating standard scores no weights were assigned for different levels of education. The length of schooling can serve as a judicious characteristic to discriminate one test from another. Table 4 is

TABLE 4

Weighted Standard Scores of Each City according to Education

City	*Literate*	*Primary*	*Matriculzte weights*	*Graduate*	*Above Graduate*	*Un-specified*	*Total Weighted Standard Score*
	1	4	11	15	17	8	
Ahmedabad	99	436	1,144	1,395	1,751	760	5,585
Baroda	97	444	1,188	1,815	2,040	864	6,448
Bhavnagar	108	380	1,210	1,470	1,581	704	5,453
Jamnagar	86	372	902	1,365	1,530	736	4,991
Rajkot	93	424	1,012	1,350	1,574	792	5,245
Surat	117	340	1,155	1,635	1,717	936	5,900
Mean	100	400	1,100	1,500	1,700	800	5,600
Standard deviation	10	40	110	150	170	80	267·58

computed taking into account this weighting system. Weights are the maximum normal length of schooling in each test. Thus "literate" will have '1' weight while "graduate" will be with weight '15'. The weight for "unspecified" is arrived by taking the average weight of education—classes 1 to 5.

Comparison between Tables 2, 3 and 4 reveals that the difference in weighted standard scores of Baroda and Jamnagar city is of the magnitude of 56 distance as against 96 distance in unweighted standard scores and 36 distance in raw scores.

This distance is thus lowered because of the assigning of weights to different levels of education. This is evident from the value of coefficient of variation which is 0.047 in this case.

The results of the repeated scaling methods are tabulated in Tables 5 and 6. Table 5 shows percentage of population of each city possessing a particular level of education or higher level. Educational levels are arranged in the ascending level of length of schooling. The last column of total gives position of each city by the method of repeated scaling.

TABLE 5

Population According to Educational Level

City	*Literacy*	*Primary*	*Un-specified*	*Matriculate*	*Graduate*	*Above Graduate*	*Total*
Ahmedabad	70·64	60·64	18·62	18·37	6·51	2·32	177·10
Baroda	83·62	75·58	32·17	31·41	18·64	5·01	246·43
Bhavnagar	70·20	54·11	20·47	20·41	7·09	0·80	173·08
Jamnagar	42·87	42·84	10·19	10·05	3·75	0·34	110·04
Rajkot	58·51	53·31	13·13	12·71	3·85	0·66	142·17
Surat	75·53	52·92	25·31	24·23	12·28	2·06	192·33

To judge the difference of total of education arrived in column of total in Table 5 with the percentage of literacy figures of Table 2 (or the first column of Table 5) these two are compared. Equating the total for Baroda with its percentage of literacy, we get 246, 43=83.62. On this basis we arrive at index of education of different cities. These indices are compared in Table 6 with corresponding percentage of literacy figures.

TABLE 6

Indices of Education and Percentage of Literacy

City	*Index of Education*	*Percentage of Literacy*
Ahmedabad	60·12	70·64
Baroda	83·62	83·62
Bhavanagar	58·76	70·20
Jamnagar	37·36	42·87
Rajkot	48·27	58·51
Surat	65·30	75·53

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It is seen from Table 6 that the repeated scaling method has differentiated the cities more sharply as evident from comparison of index of education and percentage of literacy.

Conclusion

Percentage of literacy is the simplest measure for measuring the educational level of a place. This is, however, a crude measure in the sense that it does not really take into account different levels of education. Three methods are discussed in this article in order to account for this omission: (1) Unweighted system of scaling, (2) Weighted system of scaling and (3) Repeated scaling method.

The unweighted system of scaling does separate different areas more significantly. This system however equates different educational levels and is thus a standardized form of percentage of literacy.

A more appropriate way would therefore be to adopt some weighting system of scaling. One of the weighting systems considered here is the length of years of schooling. Thos method appears to measure different areas more sensitively enabling clear differentiation of each area on the basis of the education level of the population of that area

The third approach discussed is to construct an index of education on the basis of repeated scaling method. This method takes into account at each level of education, the educational attainment of an individual in an area. This index compares very well with percentage of literacy giving a sharp discriminative power.

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The Meaning of Apperception and Its Importance in Education[1]

Anjali Chakravarty

The author critically examines the nature of apperception and brings out the importance of its role in education.

Kulpe (1909) observes that apperception is not a speculative construction or a metaphysical faculty, but an expression for undeniable facts of consciousness. He has further observed that Wundt in his doctrine of apperception has considered will and apperception to be one and the same process. By will is here meant not a new elementary quality of consciousness but the capacity which the individual possesses to determine his own attitude and action, internal and external. Wundt has shown that will and attention are intimately related; so, like voluntary and involuntary attention which do not differ in kind, there is no qualitative distinction between active and passive apperception; in both cases the process of attention is the same but the sole difference between them is that of the number of incentives.

The theory of will is controversial and has developed along different lines. The genetic method is usually followed. A child cannot 'will' to eat a particular kind of food until he has tasted it and anticipated the result. This anticipatory apperception is most essential in a voluntary action and cannot be overlooked. Apperception has an inhibitory power for which there is a distinction between associative and apperceptive connections—the former are formed by the contents themselves and are the result of given relations between ideas, e.g., their contiguity in space or immediate succession in time, while the latter require a comparative and selective activity of the subject, i.e., the aid of apperception. This distinction is intimately connected with Wundt's discrimination of passive and active apperception (Kulpe, 1909).

According to Wundt apperception is the central force in the explanation of the mental process. So apperception is given a definite nervous seat in the frontal lobes of the brain where the association fibres run from all the sensory and motor areas (Pillsbury, 1929). On the anatomical side the abandant connections mediated by association fibres between the frontal brain and other brain regions furnish a distinct support to the view that the frontal lobes contain nodal points of especial importance for the interrelations of the central functional areas (Murphy, 1956). So the frontal brain may be regarded as the co-ordination centre and stands in intimate relation to the functions of intelligence. But intelligence is an exceedingly complex and indefinite term. It is almost impossible to conceive of a specific organ for the intellectual function of apperception. A geologist may require hours of study for the apperceptive discrimination of a stone.

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[1] The author is indebted to K. C. Mukherji for his valuable suggestions while writing this paper.

We have for all psychological processes the following necessary steps. First, stimulation; second, perception (in which the experience is present in consciousness—nothing more than that); third, apperception (in which the experience is identified, appropriated and synthetized); finally, an act of will which sets going the reaction (Murphy, 1956). So perception denotes an appearance of a content in consciousness at the instance of external and internal stimuli while apperception denotes its reception into the state of of attention in relation to the previous experiences of the mind as a whole[2]. Perception is only the first step towards knowledge and may in some degree occur in all sorts of animals. To James however inconsistently with his doctrine of sensationism "creatures extremely low in the intellectual scale may have conception" which is, according to him fundamentally the function of cognition of an object (James, 1890). Price (1953) has also pointed out that rudimentary conceptual thinking is primarily a recognitional capacity and may occur in the mind, however low, without any corresponding verbal or non-verbal symbol. Apperception distinguishes man from animal and gives him the power of reflection by which the elements of experiences are appropriated and organized into a whole. Thus apperceptive synthesis is creative (Murphy, 1956). It requires will and attention in order to function adequately. So a mentally sick person will be unable to perform it[3].

This process of apperception seemed to have been very vaguely and inadequately recognized in traditional association psychology in terms of association by similarity. But Stout (1910), has clearly pointed out that, under this term, two essentially different processes of very unequal intellectual value have been confused together. He has analysed and distinguished them by the terms "reproduction or revival by similar" and "reproduction of similars". The former is a very commonplace function by which we, as Stout illustrates, mistake A for B when the perception of A leads us to think explicitly of B; or when the bearing and appearance of a girl lead us to think of a lily or a rosebud; it brings together things not previously thought of together and is thus essentially the process of apperceptive synthesis. So if an object is recognized as like a familiar object, but yet different in some respects the process is essentially one of discrimination. Discrimination is necessary for the discerning of essential similarities between objects and classes of objects for apperception. The average man can hardly distinguish one kind of drink from another but the specialist can distinguish and recognize perhaps fifty varieties of claret.

Mental growth is a treelike structure largely determined by the processes of discrimination and apperception. At first the child does not discriminate between a red apple and a ripe tomato, but when he has learned to distinguish between them through taste he reacts differently at the sight of an apple and a tomato. Discrimination is the discovery of differences. As an example of the process of apperception which discovers similarities, we observe that when a child who has not learned to regard plants as living beings learns that plants also, like the animals, are alive, two mental systems then become conjoined in his mind, and thereafter form a larger living-being system which incorporates the plant-system with itself. Stout (1918) holds that one mental system apperceives the other. Such apperceptions through the process of Stout's reproduction of similars are explicit, but apperception works also implicitly as when a verse reminds us of another the words and details of which are very different, only because of some similarity of metrical form. This may be a kind of relative or intuitive suggestion conditions of which we cannot properly analyse.

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[2] *Encyclopaedia Brittanica*, Vol. 11, p. 137.
[3] *The Encyclopaedia of Philosophy*, Vol. I, p. 138,

In the Herbartian psychology apperception is the recognition of a new impression into an already existent ideational complex which is called the apperceiving mass. The practical importance of this function of apperception is undoubted. Herbart applied this theory extensively in education. In the process of learning geography a pupil can understand a map if he knows how land, water and mountains are represented on the map of a region. So if his teacher builds in his mind a certain structure (i.e., a series of geographical symbols) and then gives him a map of Europe, all these new sensory stimuli will easily combine with the ideas which lie already assimilated in his mind. This background of ideas constitutes the apperception mass (Murphy, 1956). So the background already in the mind makes possible the assimilation of new ideas. Herbart emphasizes that knowing the mental maturity of the pupil the teacher should arrange the course of instruction in such a way that the new material can be properly integrated with the already available store of knowledge. If the two fall apart the learner cannot assimilate the new experiences and will feel frustrated[4]. So Herbart's most famous conception, the apperception mass, is a name for all those past experiences which we use when we perceive something new. So when a tea-taster looks for a particular flavour in the tea the perception of the quality depends upon the fact that there is a myriad of past tea-flavour in the man's accumulated experiences: so the elements of flavour immediately find a place and are assimilated in consciousness (Murphy, 1956). With Herbart apperception has been the process of assimilating and interpreting new impressions—a background which makes possible the assimilation of a new idea which can never otherwise be learned.

The Herbartian psychologists made a considerable advance on associationism. But Wundt was a voluntarist and stressed the importance, as already mentioned, of will or attention in the process to get rid of intellectualism (Murphy, 1956). The intellectualist doctrine of interest which was the great contribution of Herbart's psychology to educational theory has been severely

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4. *The Encyclopaedia of Philosophy*, Vol. I, p. 139.

criticized by McDougall. He holds that knowledge about an object is not in itself a condition of interest. Attention and interest are essentially conative. Stout (1924) observes that the discernment of the particular features of an object with increasing fullness of detail is specially characteristic of attention. So the more readily and rapidly apperception takes place the less attention it requires, and the more difficult it is the more attention it requires. When there is not sufficient interest in developing the object apperceptive processes fail to occur. The difference between ourselves and the animals is that, while the interests of the animals are limited as provided by instincts we extend very widely our field of acquired interests and thus develop our mental structure through a series of discriminations under the guidance of language. The whole structure of the developed human mind is like a vast tree growing through the process of successive differentiations. When an object is recognized as like a familiar object, but yet different in some respects, the process is essentially one of discrimination which results in mental growth. We have already discussed the importance of discerning essential similarities between objects and classes of objects which apperception involves in the growth of our mental structure. So a mind developed by the processes of apperception and discrimination would have knowledge of the nature of things and of the likenesses and differences between them which would make it possible to think properly about their relations.

Language plays a great part to effect the processes of apperceptive synthesis and finer discriminations for the development of mental structure. In the use of language. mental systems built up by experience and united by apperceptive synthesis become operative and determine the meaning of the word as we utter or hear it. So the name "gravitation" embodies the meaning of Newton's discovery achieved by the apperceptive synthesis of the essential similarity between the motion of the moon about the earth and that of a falling body. Language also serves to discriminate between objects. The child learns to discriminate between human beings and animals and later between individuals. mother, father and brother, and between dog, cat and bird by instruction and the use of names. Language is essential in thinking. In Plato's words: "When the mind is thinking it is talking to itself" (Cornford, 1945). According to Russell, "almost all higher intellectual activity is a matter of words, to the nearly total exclusion of everything else" (Russell, 1921). So deaf children. if deprived altogether of the use of language find it very difficult to develop the power of apperception and discrimination which are the processes of the greatest importance for the higher development of the intellect. The case of Helen Keller is indeed a remarkable exception (Mukherji, 1967).

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Education and the Promotion of Thought—A Methodological Approach

Chaitanya

The author examines the main trends in the psychology of thought and briefly describes an investigation into the nature and quality of the thinking process that he carried out with a group of students at Jodhpur.

Although teaching pupils to think has always been one of the most commonly expressed aims of education, it is only at the present time that there has been increased insistence upon it.

This is as true in India as in other countries.

E. A. Peel states that the promotion of good thinking habits at all levels of education is receving more and more attention these days, and is symptomatic of the current feeling about this growing need.[1]

These views are echoed by many authorities.[2]

In the United Kingdom the Robbins Committee on Higher Education (1963) laid down the axiom that what is taught at a university should, irrespective of its subject-matter, be so taught as to promote the general powers of the mind, and more particularly those of abstraction and generalization.[3]

The Matriculation (and Higher Secondary) Board of Rajasthan, Ajmer, is trying to compile common core syllabuses for use by all students and schools at the primary level. Guide books would be prepared to help teachers interpret the syllabuses.

This primary concern with getting the pupil to grasp the "structure"[4] of a subject rather than the acquistion of specific factual knowledge, is being felt also in the elementary school.

The new mathematics and the new science are being taught (in the Western countries) as "systems of thought", and school children are being instilled with (to quote J. B. Conant's well-known phrase) a feel for the tactics and strategies" of the intellectual systems that underlie these subjects.

The great importance which we attach to cognitive learning emerges partly from the increasing dependence of modern society on science and technology,

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1. E. A., Peel, *The Pupil's Thinking*, Oldbourne Book Co. Ltd., London, 1961
2. W. D., Wall, Learning to Think In *How and Why We Learn*, Faber & Faber, 1965, p 6.
3. K. Boehm, *University Choice*, Penguin Books, London, 1966, p. 9.
4. J. S. Bruner, *The Process of Education*, Vintage Books, N.Y., 1960

and the need to develop intellectual talent and nurture creative thinking ability, and partly from a realization that only a populace skilled in the art of critical thinking is capable of appraising the insidious propaganda of contemporary mass communication media.[5]

Notwithstanding the importance of cognitive learning in the educative process, research has been meagre and slow to develop. Indeed, research on the classroom aspects of guiding thinking is only of very recent vintage and many questions remain as yet unanswered. Although the canons of formal logic were formulated by competent thinkers centuries ago, research on the actual processes of thought were practically non-existent until well into the twentieth century.[6]

D. M. Johnson contends that the status of the psychology of thought is distressing, because much of the investigation in this field has been unsystematic, and "littered with disabled wisdoms cast off by hit-and-run theorists".

His viewpoint is upheld, *inter alia,* by B. M. Foss who states that one of the curious things about the earlier studies in connection with thinking was that they demonstrated "more than anything the inadequacies of their own methods."[7]

It is germane to this discussion to review briefly the main trends in the psychology of thought, to indicate where it stands today and to highlight its failures and achievements. This review will be dealt with under specific headings.

The Denkpsychologie Movement in Western Europe

The philosopher-psychologists of Europe held the view that the contents of the mind could be analysed into sensations (i.e., the immediate products of sensory stimulation) and ideas (i.e., images derived from sensations). Thinking was considered to be the combination of ideas into complexes according to certain laws of association To discover the content of these ideas one had to resort to introspection.

It was only recently that psychologists (Oswald Kulpe and Alfred Binet) began to direct attention to the processes rather than the products of thinking. The cognitive processes known as thinking involve reasoning, reflecting, judging, conceiving, imagining and problem-solving. They are notoriously complex and each reflects the interaction of different sorts of behaviour. Consider reasoning, for example. This process alone is concerned with activities *inter alia,* such as evaluating an argument, making a deduction, establishing

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5. It should, however, be noted that mass propaganda directed at needs, wants and emotions is designed to distort critical thinking ability.
6. R. H., Ennis, A Concept of Critical Thinking in *Harvard Educational Review,* Vol. 32, 1962. p. 81.
7. D. M. Johnson, *The Psychology of Thought and Judgment,* Harper, N.Y., 1955

a generalization, and resolving a dilemma. To attempt to analyse the processes of thought by introspection is extremely difficult. Techniques have, therefore, to be devised to externalize the processes so as to make them accessible to observation. Making the inaccessible accessible in respect of thinking has posed a challenge to empirical research to which psychologists and educationalists have only now begun to respond.

It is largely because of its techniques that the contribution of the Denkpsychologic movement, notwithstanding its early promise, did not amount to more than a few ideas on the mechanics of the thought processes.

The Wurzburg School on the basis of its technique of "systematic experimental introspection"[8] initiated a controversy on *imageless thought* which resulted in the end in a loss of faith in the introspective method.

H. J. Watt and Kulpe carried out an experiment on association which was divided into four phases. These were: (a) the preparatory phase during which instructions were given, e.g., "when the stimulus word is presented, name an opposite", (b) the presentation of the stimulus word; (c) the search for the response word; (d) the occurrence of the response word. The subjects were asked to introspect on only one phase at a time. The surprising result was that there was nothing to report in the third phase. The thinking seems to take place in the first phase, i.e., that of making the thinker aware of the task. (Mr. Watt used the word *"Aufgabe"*.) The first phase is the only significant one—thereafter the sequence runs off automatically. Acceptance of the task establishes a set Watt calls it *(einstellung)* to respond appropriately. This response Atkinson called the "Determining Tendency". Thus thinking, according to the Wurzburg School, is a process linking and determining tendency into a systematic, orderly and purposeful sequence.

However, in the present writer's view, set *(einstellung)* cannot explain the thought process. It is similar to a motive, a key factor operating in the directing and control of a thought process towards a specific goal.[9]

Nevertheless, the concept of set is of significance for the educator, since it directs his attention to the need for making the pupil comprehend fully what the problem or task is, before confronting him with it.

The role of set in thinking has other implications, and to these I shall refer presently. The view that thinking is a high level kind of skill[10] that can be acquired by training and learning has appealed to many psychologists. They regard the study of thought as closely related to the study of learning. Thus there is no need to look any further than the manner in which skills and drills are acquired in order to describe and explain thought processes.

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[8] This method is attributed to H. J. Watt, who collaborated with O. Kulpe.

[9] G. Humphrey, *Thinking : An Introduction*, Van Nostrand Co., N.Y., 1951, pp. 452 ff.

[10] Sir Frederic Bartlett:- *Thinking, An Experimental and Social Study*, Unwin, p. 9.

Gestalt Psychology in Relation to Thought

Gestalt theorists hold the view that associative learning and thinking cannot be considered on the same continuum. They strongly criticize those psychologists who contend that all behaviour, including thinking, ultimately rests on stimulus-response principles. They are totally opposed to theorists like E. L. Thorndike or E. R. Guthrie who profess that thinking rests on past associatve learning, and consists of selecting previous associations to try out in new situations.[11]

Gestalt psychology was primarily concerned with the study of perception In perception the principle of good pattern *(pragnanz)* predominates. When perception is modified it occurs, not by the accumulation of small changes, but by a re-organization of the perceptual field. The principle of organization applies also to thinking. M. Wertheimer emphasized that thinking should be seen as the re-organization of patterns rather than the piecemeal attack on the problem situation.[12] Good thinking or "productive thinking" as he called it, consists of seeing the structure of the problem clearly and re-structuring it as necessary.

Consider these straightforward and simple problems:

(i) $1+2+3+4+5=?$

(ii) $127+128+129+130+131=?$

(iii) $99{\cdot}8+99{\cdot}9+100+100{\cdot}1=?$

The piecemeal solution of simply adding one number at a time is adequate for (i), but not for (ii) or (iii).

Gestalt psychology explains the dynamics of thinking as follows: Thought begins when the thinker grasps the problem, i.e., when he sees the inner structure of the situation. Since the structure is incomplete, i.e., there is an absence of pattern *(pragnanz)*, tensions are produced and vectors are set up determining the steps to be taken to convert the structurally incomplete situation into one that is complete. This occurs more readily and with greater efficiency if the thinker has not been restricted to an educational environment dominated by stereotyped behaviour patterns.

Although some aspects of Gestalt theory, notably the notions of brain dynamics, are speculative, those relating to cognitive structure[13] with the emphasis on insight and understanding are generally accepted, and extremely valuable.

In the old primary school arithmetic, the emphasis was on associative meanings; in the new primary school arithmetic, the stress is on structural meanings.

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[11] H. F. Harlow, *Theoretical Foundations of Psychology*, Van Nostrand, N.Y., p. 452.
[12] M. Wertheimer, *Productive Thinking*, Harper & Bros. N.Y. 1948.
[13] The term cognitive structure was adopted by E. C. Tolman from K. Lewin.

Gestalt psychology has emphatically shown that true meaning depends on more than simple association. A young child may have many associations with the word "eight". It is his brother's age; it comes after seven when one is counting; it is a collection of a certain size; and so on. Yet, he may not understand its place in the number system, its distinction as a real number, as a rational number, or as a positive integer, nor its relation to other numbers in these sets. The latter concern structural meanings which involve relationship among concepts and are discovered logically.[14]

The Geneva School

Within the last quarter of a century a new tradition of research in respect of the thought processes in children has emerged, namely, that of Piaget and his Geneva collaborators.[15] This research has since World War II, been directed primarily at thinking related to the physical world, i.e., to the concepts of space, weight, volume, number, time, movement, speed, etc.

Piagets studies are ontogenetic in character, having been inspired by his interest in genetic epistomology, i.e., the study of the laws under which knowledge develops and changes. His theoretical construct operates from the premise that concepts are built up bit by bit, first slowly through the sensory and motor activities of early childhood, and then more quickly through social intercourse and language. The background organization thus acquired by the brain affects all subsequent thinking. In this developmental process, assimilation and accommodation are fundamental. Assimilation occurs whenever the individual makes a response. It involves the action of the person on objects and the changes produced in him as a consequence thereof. Accommodation involves the action of the environment on the individual. Intellectual development is not static, but involves a constant progression from less complex to more complex schema.

Piaget's method of obtaining data, like his theory, altered to some extent over the years. Initially he concentrated on the observation of children, and their response to oral questioning without the use of apparatus. In more recent years he has employed very ingenious experimental materials to aid in the posing of problems to his subjects. This is as far as he has gone in test rigour.

His clinical method *(methode clinique)* is very flexible one, and does not lend itself to statistical treatment. His method is adapted to the level of comprehension of each child, both in respect of the nature of the questions and the order of their presentation. The child is not only asked to make responses, but also to give explanations for them. By modifying the questions and the experimental conditions as the need arises, the investigator tests the genuineness and consistency of the child's responses. Furthermore, the plasticity of the technique enables one to obtain a better insight into the nature of children's thought.

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[14] D. R. Green, *Educational Psychology*, Prentice-Hall, New Jersey, 1964, p. 51

[15] For a review of Piaget's work consult:
(a) M. A. Wallach, *Research on Children's Thinking*, Chicago, p. 236
(b) J. G , Wallace, *Concept Growth and the Education of the Child*, Wales
(c) D. E., Berlyne, *Recent Development in Piaget's Work*, London

This lack of standardized procedure has been severely criticized and has led to some of his co-workers, notably Vinh-Bang and Inhelder to devise new and more exact techniques.[16]

Piaget's study has been cross-sectional. This, too, has been severely criticized, and has induced Inhelder and others to undertake longitudinal studies, in which children aged 5 years were subjected thrice yearly for a period of several years to a battery of Piagetian experiments.

From the longitudinal studies it would appear that the stages of development as outlined by Piaget do not seem to occur in a stable order. However, the research is incomplete, and much more remains to be done.

Although Piaget concluded that the order of succession of the stages of intellectual development was constant, and that ages of attainment could be assigned to them for a particular population, cognizance had to be taken of variations due to cultural milieu, motivation, and so on.

Here brief comment on these stages may be made.

1. *The Sensori-motor Stage:* This stage has six sub-stages. During this stage (from birth to 2 years), the child has not yet acquired language and can only perform motor actions. It is the stage at which the child develops his senses, and solves simple sensori-motor problems.

2. *Concrete-operational Stage:* This stage extends from the middle of the second to the eleventh or twelfth year. It is divided into a period of formation followed by one of attainment. The division occurs at about the age of seven years. The first sub-stage, the pre-operational, is characterized by a long period of elaboration of mental processes, made possible by the development of language. The thought processes are "concrete" in the sense that they deal only with objects which can be handled or imagined in concrete form. A five-year-old, for example, has long since grasped the permanence of objects, but has no notion of the elementary physical principle of conservation of matter. (He does not comprehend that the quantity of liquid remains unchanged when poured from a glass tumbler into a shallow dish, to mention but one example.)

By about the age of seven years the child enters the *concrete operational stage proper* ,when the concept of reversibility, characterised by (a) negation and (b) reciprocity, appears. At this stage these forms of reversibility are used independently of each other. The concept of conservation (inherent in

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16. (a) K. Lovell, E. Ogilvie, *A Study of the Conservation of Weight in the Junior School Child, Brit. J. Educl. Psychol.,* Vol. 30
(b) K. Lovell: *A study, Brit. J., Educl. Psychol.* Vol. 31.

which is that of reversibility) is applied to quantity of matter earlier than to weight, and lastly to volume.

3. *The Formal Operational Stage:* This stage begins at about eleven or twelve years of age, and in a rich cultural environment this stage comes to form a stable system of thought structures by about fourteen or fifteen years of age, Thinking becomes altogether dissociated from the concrete data, and complete conceptual generality is achieved, making hypothetico-deductive reasoning possible. It is at this stage that pupils are capable of understanding truly scientific investigations and learning science in a meaningful way.

The work of the Geneva school of psychology has been dealt with at some length, because for the educator two major issues remain as yet unsolved: (a) How can the cognitive problems dealt with in the classroom be related to the developmental stages of children? (b) Can a training programme be devised to speed up the transition from concrete to formal operations?

J. R. Suchman (1960) has tried to do the latter with pupils in the primary school. Using loop films he demonstrated a number of physical science experiments: e.g., a small amount of water was placed in a thin-walled can and boiled, then corked and cooled, with the result that the sides of the can collapsed. After a specific type of training programme which he had devised, he found that the pupils asked more questions, were more accurate in describing what they saw, more skilful in making deductions and formulating hypotheses.

The Creativity Creed

During the past decade attention has been focused, especially in the United States of America, on what is termed creativity. J. P. Guilford, of the University of Southern California, has brought the intellectual aspects of the problem to the forefront in his theoretical model of the structure of the intellect. Using the technique of factor analysis as applied to mental tests, he isolated a number of processes in the realm of mental operations. Among these he posited convergent thinking, divergent thinking and evaluative thinking as being extremely important.[17]

By divergent thinking, Guilford means thinking that is not dominated by the conformist or conventional approach. It is thinking characterized by originality, flexibility and fluency. But P. E. Vernon and A. J. Copley assert bluntly that "it is unacceptable to think of creativity as a separate basic intellective mode."

Some Aspects of the Thinking of Selected Groups of Students of Jodhpur.

In 1966 the present author commenced an investigation into the nature and quality of the thinking processes of groups of students of Jodhpur. This

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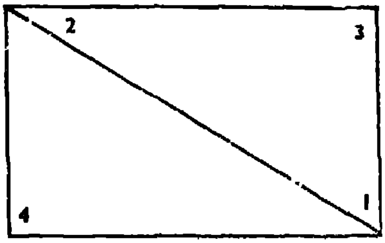
17. (a) J. P., Guildford, *Creativity* in *Amer. Psychol.* Vol. V, 1950, p. 445
(b) J. P. Guildford, *Intelligence* 1965 *model, Amer. Psychol.* 21

research is concerned with the cognition of mature students in whom thinking has already reached a measure of sophistication.

Details of the examples and the results are provided below.

The subjects were reassured that this was not an examination, but a questionnaire designed to find out "what you do when you think."

Example: A knowledge of geometry is not necessary to answer this question.



If angle 2=angle 3, angle 3=angle 1, and angle 1=angle 4, we can conclude that angle 3=angle 4. Upon what principle is this conclusion based? Thirty-six per cent of students of city background answered correctly and 18 per cent of students who came from villages.

It was found that many of the students who made incorrect responses, did so because they based their judgement on irrelevant cues dictated by the diagram and the mathematics they had learned at school, instead of relying solely on axiomatic logical concepts.

Some of the incorrect responses read like this: "Base angles of a triangle are equal. . . .Line separating the two triangles is a transversal line. . . . Opposite angles of a parallelogram are equal. . . ."

Some of the correct responses read as follows: "If there are two or more groups with units that are equal to one another, and one unit in the group equal to another unit, then all are equal. . . .That which is applicable to any element of a whole is also applicable to other elements of the whole . . . .All equals are equal."

Conclusion

The methodology of education can be fruitfully planned or pursued only if we know how children think.

The clinical method and the interview technique are time-consumig and cannot be used on an extensive scale. The open-end questionnaire in which attention is given to the more humdrum forms of "reproductive S-thinking", appeals to the present writer as a promising method for large-scale investigation.

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Research Notes

A Study of Gifted Children

This study was conducted by Champa Bhatt at the A.G. Teachers' College, Ahmedabad, under a research grant from the National Council of Educational Research and Training, New Delhi.

The purpose of the study was:

1. To develop 'simple and inexpensive" procedures for identifying the gifted based mainly on teachers' observation and academic record. "Gifted" in this study were taken to mean children superior in intellectual ability as measured by traditional intelligence tests with high academic achievement.

2 To study the personality traits of children.

The sample consisted of the entire school population of some 540 pupils studying in Classes V through X in the A. G. High School, Ahmedabad.

The pupils were first screened on the basis of I.Q. scores, school record and teachers' judgement. In all 180 pupils—106 on the basis of I.Q. scores, 45 on the basis of achievement record, and 29 on the basis of teachers' ratings—were selected for study. A list of traits was developed which included especially those traits which were normally found among the intellectually gifted. 35 traits out of a total of 59 were selected on the basis of a try-out to be included in the final list. The list was validated against the traits actually possessed by a 'known' group of the intellectually gifted children selected on the basis of I.Q. scores alone. The reliability of the trait list was obtained by the test re-test method. The validity was obtained by rating the non-gifted on the list and comparing their scores with those of the gifted. Cross-validation studies were conducted in four schools. The author claims that it is possible to locate the gifted in a school on the basis of the trait list without testing the entire school population on an intelligence test which may not be possible for a school to use. A check on this 'short-cut' method was made by administering the list to a school population of 957 pupils spread over 25 classes in four different schools situated at four different places in the semi-urban and rural areas. The method was found to work satisfactorily.

The second part of the study aimed at studying the personality traits of gifted children. Twenty 'gifted' and twenty 'non-gifted' children were studied through the interview technique. Both the pupils and their guardians were interviewed. The gifted were found to be distinctly superior to the non-gifted in intellectual pursuits, regularity in studies, leadership qualities.

originality, understanding, self-confidence, politeness and choice of companions. However, most of the qualities were found to be common to both the groups. It was, therefore, concluded that the gifted pupils differ from the non-gifted ones in the number and intensity of traits possessed.

Influence of Intelligence on the Needs of School Children

This study was undertaken by K. Kumar of the College of Education, **Banasthali Vidyapith** (Rajasthan).

The common feeling is that the prominence of the various needs among the individuals is controlled and guided by the level of their intelligence, whereas certain studies report that intelligence is not significantly related to the personality characteristics. As need is an important aspect of personality, it was found worth investigating how far the prominence of needs among school children is controlled and guided by the level of their intelligence. So, the purpose of this investigation was to answer the following specific questions:

1 Are the Needs of school children influenced by the level of the intelligence?

2. Do the Needs of the supernormals and subnormals differ significantly in their prominence?

In addition to this, there was the objective investigating sex differences on the needs under study.

Intelligence tests constructed by S. S. Jalota, P. Mehta, and C. M. Bhatia were used to judge the level of intelligence of school children. The Needs Rating Scale, constructed and standardized by the investigator, was administered to assess the needs of school children. The Needs Rating Scale has been standardized on 1394 boys and 1064 girls, and provides Norms ranging from Class VII to Class XI. Reliability coefficients range from .80 to .92, and Validity coefficients from .55 to .70.

Two samples were drawn for the purpose of this study. The first sample included 100 boys and 100 girls, selected randomly, to study the relationship of intelligence and the needs under study. The second sample included 50 boys and 50 girls for the supernormal group, and 50 boys and 50 girls for the subnormal group. Those falling above an I.Q. of 110 were included in the supernormal group, and those falling below an I.Q. of 90 were included in the subnormal group. All the school children for the samples were selected from Class VIII of the schools situated in the urban areas within the Jalipur Division of the State of Rajasthan. The two groups of cases included only such cases which could be declared so on the basis of all the three tests of intelligence.

The data was analysed in two ways; firstly, through the calculation of the coefficients of correlation obtained between composite scores on Intelligence tests and scores on the Needs Rating Scale; and secondly, through the study of the critical ratios obtained on the basis of the differences between tho means representing performances of the various groups.

The coefficients of correlation obtained between composite scores on Intelligence tests and scores on Needs Rating Scale were the following:

Needs	*Boys*	*Girls*
1. Abasement	·15	—·16
2. Aggression	—·48**	—·17
3. Defendence	—·37**	—·31**
4. Dominance	·03	—·29**
5. Sex	—·43**	—·54**
6. Autonomy	—·22*	—·39**
7. Succorance	—·31**	—·34**
8. Exhibition	—·23*	—·38**
Total	—·27**	—·46**

**significant at and beyond ·01 level
* significant at and beyond ·05 level

To be significant for an N of 100. a correlation should be .20 at .05 level, and .25 at .01 level. In the light of this criterion, seven correlations were found significant for boys, and seven for girls. All these correlations were found significant in the negative direction. The conclusions drawn, out of this study, were the following:

Boys

1. The presence of the Needs of Abasement and Dominance is not influenced by the level of intelligence of boys.
2. The presence of the Needs of Autonomy and Exhibition is influenced by their intelligence, but to some extent only.
3. The presence of the Needs of Aggression, Defendence, Sex, and Succorance is influenced by the level of their intelligence to a sufficient degree.
4. Intelligent boys are likely to show a lesser presence of these related Needs, whereas they may be found in more prominence among the boys of low intelligence.
5. On the whole, it can be interpreted that with a rise in the level of intelligence of boys, the presence of the related Needs on the whole starts coming down

Girls

1. The presence of the Needs of Abasement and Aggression is not influenced by the level of intelligence of girls.

2. The presence of the Needs of Defendence, Dominance, Sex, Autonomy, Succorance and Exhibition is influenced by the level of their intelligence to a sufficient extent.
3. Intelligent girls are likely to show a lesser presence of these related Needs, whereas they may be found in more prominence among the girls of low intelligence.
4. On the whole, with a rise in the level of intelligence of girls, the presence of the related Needs on the whole starts coming down.

The Critical Ratios, obtained on the basis of the differences between the means, were the following:

Needs	*Supernormal and Subnormal Boys*	*Supernormal and Subnormal Girls*
1. Abasement	0·43	0·93
2. Aggression	5·62**	2·00*
3. Defendence	3·00**	3·46**
4. Dominance	0·00	2·77**
5. Sex	4·62**	6·37**
6. Autonomy	1·85	4·38**
7. Succorance	3·57**	3·33**
8. Exhibition	1·68	3·79**

**significant at and beyond ·01 level
*significant at and beyond ·05 level

To be significant a CR should be 2.58 at .01 level, and 1.96 at .05 level. In the light of this criterion, the following conclusions were drawn.

Boys

1. The performances of the supernormal and subnormal boys differ significantly on the Needs of Aggression, Defendence, Sex, and Succorance. As on all these four Needs, the means were found significantly high for the subnormal group, it can be that the Needs of Aggression, Defendence, Sex, and Succorance are significantly in more prominence among the subnormal boys as compared to the supernormal ones.
2. The supernormal and subnormal boys do not show significant differences on the Needs of Abasement, Dominance, Autonomy, and Exhibition.

Girls

1. The performances of the supernormal and subnormal girls differ significantly on the Needs of Aggression, Defendence, Dominance, Sex, Autonomy, Succorance and Exhibition. As, on all these Needs,

the means were found significantly high for the subnormal girls, it can be said that the Needs of Aggression, Defendence, Dominance, Sex, Autonomy, Succorance and Exhibition are significantly in more prominence among them as compared to the supernormal girls.

2. The supernormal and subnormal girls do not differ significantly on the Need of Abasement.

The critical ratios obtained with a view to study the sex differences were the following:

Needs	*Supernormal Boys and Girls*	*Subnormal Boys and Girls*
1. Abasement	0·26	1·11
2. Aggression	1·27	2·25*
3. Defendence	2·03*	2·32*
4. Dominance	2·77*	0·17
5. Sex	0·76	0·72
6. Autonomy . ..	1·71	0·65
7. Succorance	0·71	0·55
8. Exhibition .. .	1·25	1·01

*significant at and beyond ·05 level

In the light of the criterion, mentioned previously for judging the level of significance of CR, the following conclusions were drawn.

Supernormal Boys and Girls

1. The performances of the supernormal boys and girls differ significantly on the Needs of Defendence and Dominance. As, on these two Needs the means were found significantly high for the boys, it can be said that the Needs of Defendence and Dominance are more prominent among the supernormal boys as compared to the supernormal girls.

2. The supernormal boys and girls do not differ significantly on the Needs of Abasement, Aggression, Sex, Autonomy, Succorance and Exhibition.

Subnormal Boys and Girls

1. The performances of the subnormal boys and girls differ significantly on the Needs of Aggression and Defendence. As, on these two Needs the means were found significantly high for the boys, it can be said that the Needs of Defendence and Dominance are more prominent among the subnormal boys as compared to the subnormal girls.

2. The subnormal boys and girls do not differ significantly on the Needs of Abasement, Dominance, Sex, Autonomy, Succorance and Exhibition.

A Study of the Relationship between the Qualfications of Teacher Trainees and Their B.Ed. Marks.

This study was conducted during 1968-69 at the Government College of Education, Chandigarh, by N. L. Dosajh. In the admissions to the B.Ed. class of this institution that year, preference was given to applicants with a Master's degree over all others, including Junior Basic Trained teachers who claimed superiority because of their being in the teaching profession already. This study was therefore undertaken to determine whether the basic qualifications of candidates at the time of entrance to the B.Ed. course make any difference to their performance in the final B.Ed. examination.

Random samples of students of the B.Ed. class at the Government College of Education, Chandigarh, for the previous four years (1967-68, 1966-67, 1965-66, 1964-65) were taken. (For the year 1967-68, information about the J.B.T's was not available.) The means of marks obtained in the B.Ed. examination were calculated for each of the four years for four sub-groups: M A's, B.Sc's, B.A.'s, J.B.T's. The difference between the means was determined by the 't' method. Intercorrelations between marks obtained in the M.A., B.Sc B.A, and J.B.T. examinations on the one hand, and the B.Ed. marks on the other were computed with an electric computer.

The findings from the results of this study are as under:

1. The performance of M.A.'s in the B.Ed. examination is, on the whole, superior to that of the B Sc.'s, B.A.'s and J.B.T.'s.
2. The performance of B.Sc's is, on the whole, superior to that of the B A's and J.B.T's.
3. There is no very significant difference between the performance of B.A's and J.B.T's.
4. The marks obtained in the M.A., B.Sc., B.A. and J.B.T. examinations bear no very significant correlation with marks in the B.Ed. examination. (There were, however, two exceptions. In 1966-67 the M.A. marks and in 1967-68 the B.Sc. marks correlated significantly with with B.Ed marks.)

BOOK
REVIEWS

Studies in Aspiration and Motivation

Indian Villages in Transition: A Motivational Analysis.

By Durganand Sinha, Associated Publishing House, New Delhi, 1960.

Simultaneously, with the launching of the community development programmes in the country, the officials in charge of these projects started talking of ensuring participation of the people in these programmes. It was declared that the main aim of the community development programmes was to bring about mental revolution in order to fire villagers with a desire to improve their standards and to instil in people "a will for better life". Social scientists also started taking some interest in these development activities. In the past few years several such studies have appeared (for example, Pareek and Chattopadhaya, 1967; Chatterjee, 1966).

Six Studies of Hopes, Fears and Aspirations

The author has reported six studies on Hopes, Fears and Aspirations using various techniques like interview, performance tests of level of aspiration and semi-projective techniques. The studies were conducted in six villages drawn three each from two blocks—one known for responding well to the programme of community development and another not responding so well. One adult member of each family in the villages included in the sample was studied for the purposes of the present research. All the villages ranged in population between 700 to 900.

Hopes and Fears

A self-anchoring ladder was used for this purpose. The hopes and aspirations were classified under three groups: (1) self, (2) village, and (3) nation. The two groups of villagers did not differ very much on the ten most frequently mentioned items of Hope and Aspiration. The high correlation indicated similarity in the patterns of hopes and aspirations at all three levels (P. 83). The fears were also similar, mostly centering round food, cloth, cattle, house, money. "The two groups did not seem to differ very much with regard to patterns of fears and apprehensions". The author adds further, "However there seemed to be greater degree of pessimism and vagueness regarding fears expressed by the villagers from the undeveloped areas" (P. 86). The author later says, "There did not exist any discontent or frustration regarding the existing state of affairs. There also did not exist a strong urge for striving for overcoming the deficiencies in future." (P. 98). (One may note the expression "urge for striving".)

Concept of Happy Life

Open-ended responses were obtained from the Ss on their concept of happy life. "The needs expressed in the protocols were enumerated as they occurred" (P. 55). Finally 32 descriptive categories were developed to classify the expressed needs. Example of some categories of needs are: "Education", "Health", "Service and Business", "Good Agricultural Produce", "Need for Achievement", "Values and Ideals", "Transport and Communication" and "Undefined Needs" (Pp. 56 and 57). These categories were considered as "indicative of the area in which the motives and aspirations of the subject were directed and the fulfilment of which constituted what he considered to be a good and happy life. (P. 55). From the data thus collected the following conclusions were drawn: The subjects from the developed areas displayed relatively greater concern for certain psychological need. The concept of farmers from the developed villages was also characterized by more reality orientation and the projections of undeveloped villages were more vague and undefined."

The Level of Aspiration—I

A grain sorting test was used for this purpose. Different kinds of seeds and grains were used. The subject was required to sort out the small white grains from the rest. The goal set after the first performance was taken as the level of aspiration. Six trials were given to this game. The results indicated no difference between the mean aspiration and mean performance in all the six villages. The goal they aspired in their performance was seldom much higher than their last performance. "A positive goal discrepancy score of 3 to 8 was indeed low and indicative of risk avoidance" (P. 108). The author concluded "Nearly all the subjects irrespective of whether they came from well-developed or undeveloped villages displayed this kind of highly cautious and unenterprising approach and absence of risk-taking". (P. 108). The author later drew another conclusion that "There was greater urge towards improvement in performance and higher setting of goals among the villagers from developed areas." (P. 112). Writing generally about the results obtained on this test the author thought that "the field of agriculture like any other field involves considerable risk in the acceptance of innovation or in making larger investments in the hope of better return in future. In other words, they (those who accept innovations reviewer) would have higher level of aspiration and larger goal discrepancy". (P. 115). Concluding this study the author further added "The performance was generally characterized by high degree of caution and lack of enterprise. There was no urge to take chance and a constant desire for avoiding risk-taking was displayed. It may be said that they had a strong fear of meeting with failure and as a result they seldom set their goals very much higher than what they had attained in the past." (P. 119). The auther added further on the next page "However, 'progressive' subjects from developed villages displayed a stronger tendency to set higher goals. Thus, they displayed greater proneness to face risk of failure in their performance."

Level of Aspiration—II

For this study a modified version of Pareek and Chattopadhaya projective test was used. In all, 11 areas were covered. The test was conducted individually. The subject listened to the story of Shyamoo, a typical farmer, and were required to guess the condition that he thought would come about in the Shyamoo's life in different areas in the next five years. The results indicated that the farmers showed responses in the moderate area for each category. The two groups of villagers showed significant difference in their aspiration about agricultural produce. Looking at the general aspiration level and the scores in individual areas the author concluded that "the developed villages tended to have relatively higher level of aspiration than their counterparts from the undeveloped areas". (P. 142)

Behaviour Ratings

This study was made through the ratings of total behaviour in order to find out the level of motivation. This was studied with reference to concrete behaviour exhibited in the past and at the present time and what he expected to do in the future. The analysis of actual behaviour was taken to provide the measure of motivational level, while the projections for the future as indices for the level of striving. Seven areas of concrete behaviour were determined, relating to collective activities, election to various posts, welfare activities like road or school construction, flood protection, changes in farming, education of the family, adoption of new public health measures and change in the level of requirements, and the preparation for village development. The assessment of past and present activities was made on the basis of information obtained from the village-pramukh in block personnel. Further the villagers were required to say what they would like to plan for the next five years in each area. This was taken to represent as aspiration. The results indicated that "The behaviour ratings for all the three levels for the developed villages indicated higher accomplishment and thereby reflected stronger motivation. The overall level aspired in future was also higher than in the undeveloped group. However, the aspirational level was slightly lower than the past achievement. (P. 150) Some pages later the author concluded that "in respect of striving and aspiration for the future in spite of the higher overall score the level of striving was low in the developed villages. The goal aspired for future was not much higher and in many instances, it was lower than what had been obtained in the past. A large number of individuals irrespective of villages from which they had come or the level of development therein, had a low positive or negative discrepancy score. They were sluggish in their striving and did not view the future with optimism." (P. 160)

Attitudes and Opinions

The study of attitudes and opinions was conducted through interviews. The responses were classified under eight categories: (1) attitudes toward new methods of agriculture, (2) attitudes toward community development and panchayats, (3) perception of needs, (4) concern for future, (5) sphere of interest, (6) perception of progress, (7) attitude to work and fate and (8) extent of urban orientation. The author thought that "analysis of attitudes and opinions would reflect to some extent motivation and striving". (P. 161) The category of needs included "personal needs" like "concern for food, clothing, house and money" agricultural needs and worries, health needs, social relations and "general worries." There were three sub-categories of "General needs of villages, education and luxury". (Pp. 174-175) Another sub-category of "Important needs" included immediate personal needs (like food), family and personal welfare, social relations, religious needs like "dan-puja"; service needs like having a "job". (P. 179 The author later concluded, "villages had a very restricted pattern of needs. Their inventory of requirements and wants was small. However villages from developed blocks seemed to have more varying wants". (Pp. 202-203) The villages showed over-whelming concern for longevity and family and money matters. The data showed that, "many had taken their poverty and misery as a matter of course and with a fatalistic attitude. They had accepted them as inevitable"... "However there was a widespread belief that economic conditions would improve in future. This sense of optimism was strong and more prevalent among the advanced villages". (P. 204)

General Conclusions

In the last chapter while summarizing the results, the author has drawn certain important conclusions as follows:

1. No fundamental difference in the pattern of motivation and aspiration among the villagers from the progressive and poor areas.
2. Motivation largely centred on immediate problems of subsistence and daily living.
3. The urge for collective work as vague.
4. There was very little community feeling or the concern for problems of state or country.

5 The outlook was narrow and parochial.

6. Their hopes, aspirations and fears seldom went beyond purely personal or family spheres. They were confined largely to the matters of immediate economic necessities. Their world was limited. Often the leaders have been saying that new aspirations have begun in villagers. There is not much evidence of this factor from this study. The villagers particularly from undeveloped areas displayed less reality orientation and a greater concern for their necessities of life or were diverted by needs and goals which were definitely beyond their span of attempt.

Different Studies of Aspiration

An attempt has been made above to give all the relevant results and the conclusions reached by the author from the different studies reported in the book. Unfortunately the author has not shown as to why there was a need for these various studies more or less on the same variables, i.e., the aspirations of villagers. Having conducted these different studies the author did not compare the data obtained on the various studies. In the absence of such a comparative discussion, the results obtained from the different studies tend to hang here and there in the book. The author started to try out some psychological techniques in the village development. Certain statements made repeatedly in the book suggest that the author implicitly hypothesized that the aspiration of the respondents from the so called developed villages would be higher than those from the undeveloped villages. The selection of Ss from two groups of villages—"developed" and "undeveloped"—also suggest this assumption. If this was the assumption, it would have been better had it been expressed clearly in the beginning of the report. This would have given a better look to the results. At several places the author reports no difference in aspirations or hopes or fears between the two groups of villagers. But in the next sentence after adding "however" he reports that "The villagers from developed areas showed either higher aspiration or somewhat different results. Such contradictory statements give an impression to the reader that the author wants to show that the villagers from the developed or the progressive villages were psychologically different in their aspiration or motivation from the other respondents.

Motivation and Level of Aspiration

The report has been presented as ananalysis of the motivation of villagers. The author believes that one's motivation is revealed in his level of aspirations or attitudes or opinions. Throughout the book the concepts such as hope, fear, drive, urge, motive, need, want, aspiration have been used almost interchangeably. Conceptually these terms do not reveal the same psychological content.

Which Motivation?

The author has used the term motivation in a general way throughout the book. We now know several motives more or less definitely. Several researches have been published on motives like Achievement, Power Affiliation. Dependency, Extension, Fear of Failure and Hope of Success. The well known experiments conducted by McClelland and associates (1953) presented a break-through for the study of what is now known as Achievement Motive. The later volume edited by Atkinson (1967) brings together several researches on Power, Affiliation, and Achievement motivation as well as studies on several conceptual and methodological issues. Birney (1967) and Heckhausen (1967) have presented interesting data both on the methodology and concept of motives like Fear of Failure and Hope of Success. These motives are distinctly perceptible and conceptually clear as different aspects of motivated behaviour. When we talk of motivation for development we really want to say that certain kinds of desired motivation is needed which would lead to development. In this context the Achievement Motivation is one which has been found to show important relationship to social and economic development. McClelland (1961) presents interesting data on the relationship of Achievement Motive and an economic growth. Similarly, Dependency, Motivation and Fear of Failure or Avoidance Motivation are conceptually related to economic backwardness. These motives are likely to retard modernization and the tempo of developmental activity. It will thus be seen that not all kinds of motivation lead to development. Individuals or societies might be found motivated in one or another way but it does not follow automatically fro mthis fact that such motivated behaviour would lead to economic or social development. The author unfortunately does not take into account these clear findings which are available conveniently in published work. He talks of general motivation all the time without caring to let us know which motive he wants to see developed or which motive he is trying to study. In the absence of this conceptual clarity we do not get any picture about the pattern of motivation in the villages studied. This has resulted in collection of confusing information about the motivation of villagers. The studies seem to have failed to meet with the basic objective with which these were undertaken namely to present an analysis of the motivational pattern of the villagers. For example, are the villagers studied, high on Achievement Motive or high on Anxiety or Fear of Failure or on Dependency or Power Motive? What are the various combinations of the various motives in them and, what are the implications of these combinations in relation to the community development? Such questions remain unanswered in spite of the fact that so much data have been presented in the report.

Need for Achievement, Fear of Failure, Risk-Talking Behaviour and Level of Aspiration

As mentioned above, the Need for Achievement (or *n* Achievement) has been found to be related to economic development. This concern for excellence or an urge for better life has been found on the increase in developing countries (McClelland, 1964). Studies have indicated that persons having high Need for Achievement tend to show a moderate risk-taking tendency. Other researches point out that persons high on fear of failure and low on *n* Achievement tend to show tendencies either for talking high risk or low risk. Conceptually the risk-taking behaviour is similar to the goal setting behaviour in level of aspiration test. Some years ago Lewin (1938, 1952) gave us his famous Theory of Valence. Success and failure have different valence or attractiveness for different persons. The goals which might lead to either success or failure attract some people and repulse some other people. Atkinson and Feather (1967) have brought together the relevant findings on Need for Achievement Anxiety or Fear of Failure, risk-taking behaviour, incentive value or valence of success and have presented a Theory of Achievement Motivation. The theory predicts that persons high on Need for Achivement and low on Anxiety tend to show greater performance in competitive tasks than those persons who are low on need for Achievement and high on Fear of Failure. Some similar results have been obtained in researches in our country (Mehta, 1969). In spite of these clear results, the author has taken the stand that higher level of aspiration is equal to higher level of motivation. There is sufficient evidence to show that economic development is promoted by persons having high Need for Achievement, low Fear of Failure, tendency to take calculated or cautious risk and having a desire to serve people or extension motivation. In the absence of clear conceptualization, the findings presented by the author add only to our confusion. The author had in several analyses really found the farmers to have the tendency for taking moderate and cautious risk. Due to conceptual confusion he mistook these results as indicative of risk-avoidance or lack of enterprise. At several other places he has lumped together both the high risk tendency as well as modern risk tendency to go with fear of failure. At other place he has suggested that the villagers lack motivation because they lack high aspirations. In the absence of a clear theoretical framework, in spite of huge amount of data the study has resulted in sweeping and contradictory conclusions.

The Style

The book starts with several quotations from officials as well as political leaders about community development. It ends with similar popular statements, by the author himself in the concluding chapter. Such statements as are made by political eaders and which have also been made by the author, could be made without any empirical study. What was needed was to confirm or reject such statements on the basis of facts collected scientifically. The use of the present tense, particularly in the last chapter, in reporting research mixed with general statements, ("Viewed in this light, the basic problem boils down to bringing about transformation in people's social and economic values and consequential changes in their occupational and aspirational goals and behaviour so that the desired level of development can take place smoothly within the general framework of democratic planning"—P. 253) make the book seem like popular reading. Expressions like, "however", "great care", "of course," "generally speaking," "it was felt" provide additional source of confusion. The author makes one statement about certain tendency in the villagers and makes another statement by prefixing, "however," to only contradict the earlier statement. Such expressions give the impression that the author somehow wants to show certain things in villagers which he says anyhow with or without data.

In the absence of precise conceptualization and a clear theoretical frame, the huge amount of data have resulted only in misleading conclusions and contradictory and confusing statements. The style of reporting and generous use of long popular statements have added further confusion.

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The Role of Research in Educational Planning

Educational Research and Educational Change

Torsten Husen and Gunnar Boalt. Akmqvist & Wiksell, Stockholm.

All the countries which want development must plan their activities in order to effectively use their resources and gain the optimum benefits from their utilization. Planning thus has not now remained a prerogative of Communist countries.

Most developing countries like India develop their five-year or three-year plans. But unfortunately much of this planning is done on the opinions of so-called enlightened observers or on meagre or unreliable data. The book under review indicates the benefits of the role of research in fruitful planning. Since the middle of 1940 all aspects of the Swedish educational system at all levels have been subjected to thorough review by government committees aided by competent teams of researchers from various Swedish universities and such other centres. There was a regular liaison between policy makers and researchers. The dialogue between these two constituents of any change in the society was formal as well as informal; the most important thing is that it was continuous throughout these years. The problems taken up by the research teams were genuine—sometimes posed by the policy makers from the government, sometimes highlighted by the research previously done. The book under review gives the various researches conducted in Sweden in the last few decades especially pertaining to objective, structure and curricula in the Swedish educational system. The titles of the chapters are descriptive; for example, the changing goals of the Swedish school, curriculum research, etc. I am sure most Indian educators, especially those who want to take up research not to satisfy the 'ivory tower' status needs but to find out pragmatic solutions to the problems faced by the surrounding system, would like to go through the book which is very lucidly written. It may not be out of place, however, if a few observations are made here regarding the implications of these studies for the Indian school system.

One of the problems which most democratic countries face is whether to run comprehensive schools or to differentiate students at a relatively young age into the 'academic' students who will later study in the universities and the 'practical' students. Should we, for instance, divert a large chunk of students of our student population to vocational or technical schools after Class VIII or should even these students be allowed a further phase of exploration of their interests and development of their abilities which may enable some of them to go to universities? As in India even in Sweden there were many, irrespective of whether they have a conservative or radical outlook upon school organization, who thought that there was a fixed number of students able to profit from academic instruction at the pre-university and university level. On the other hand, many poltiical and social leaders emphasize the principle of equal opportunity. Those who are conversant with the recent row in the Maharashtra Legislative Assembly over the principle of selectivity and diverting high school students to 'A' and 'O' Level would not say that this problem is unique to Sweden.

The Swedish data suggests that if students are differentiated at a comparatively young age the probability is high that the children from the upper strata of the society will continue to go to the universities while those from the lower strata will continue to lag behind in their professional development. If, on the other hand, comprehensive schools are provided, gradually a large proportion of the children from the lower strata of the society will become capable of university education thus ensuring their professional growth. Most probably the variables that operate in the changing, dynamic society of Sweden would also contribute in the same direction in India. One can collect such data in India and try to indicate the benefits or otherwise of the comprehensive system of schools in India.

What should be the curricula for the students in schools or colleges? Again, in most cases in India this problem is solved by committees of subject-matter experts. These committees have no data regarding the necessities and expectations by the industries or other employing organizations who are going to get work from these students after the training. Of course, it will not be desirable to entirely tie up the curriculum with the requirements of the industries or other employing organizations. But the information regarding the requirements of the vocation provides some important clues which should be taken into consideration while developing curriculum. Chapter II describes a study conducted in Sweden to know the requirements of the employing organizations. Studies were also taken up in order to collect information regarding what it is that the adults retain during their professional life as a result of the school training. All these data—the ranks by the employing organizations on topics as well as the results of tests administered on the employees—suggested many clues for improvement of the curriculum in Sweden.

Chapter 4 discusses the studies in the context of the teacher's attitude It was found that there was quite a lot of tension between the reformers and large categories of teachers regarding the structure and curriculum of the nine-year compulsory school. Many teachers felt that changes in the curriculum will add to their burden. This is again a problem similar to the one being faced in India. While NCERT and many other organizations are trying to introduce a new curriculum in pursuance of the Education Commission recommendations, many teachers are expressing their fear regarding the desirability of this change in the curriculum as well as the feasibility of its being taught in the present school structure. The Swedesh findings in this respect are given below:

1. The new types of teacher training lead to more positive attitudes to

the reform of education than the traditional types of training, provided that the new type of teacher training gives more information about the reform and its consequences.

2. The attitudes of teachers whose teaching situations have changed greatly by the reforms are more negative than that of those whose situation has remained largely unchanged.
3. There is positive correlation between knowledge of, and attitude towards, the reform of education.

In the chapter on Home and School, studies are reported which describe the parental attitudes and behaviour as they affect the students' behaviour in school. In the context of the growing interest in the problem of student indiscipline in India the following findings of the Swedish studies are interesting.

The disciplinary disturbances as experienced and rated by teachers are positively correlated with:

1. Non-child centered upbringing attitudes in parents.
2. Lack of agreement in upbringing attitudes between father and mother.
3. Lack of agreement in upbringing attitudes between parents and teachers.

The correlation tends to be higher for boys than for girls. Most probably the girls do not manifest indisciplined behaviour due to the social and cultural role expectations from them.

The last chapter describes the various studies indicating the role of education in social mobility and the development of lower strata of the society. In a democratic industrialized society education becomes the main tool with the help of which the lower class of the younger generation can climb up the ladder. The constitutional guarantees for equal social and economic opportunities would remain only a promise unless educational opportunities are provided to all the strata of the society. It must also be noted that educational opportunity does not only mean a school building and few bodies of teachers. What experiences are provided in these schools through these teachers is the most crucial element. The families belonging to the upper strata of the society provide many learning experiences to their children in their home. Schools may have to compensate for the inadequacies in the family environment of the lower strata of the society. If this is done many a seed that does not sprout will certainly grow into a tree. The concept of the reserves of ability introduced by the Swedish studies is a powerful one and one wishes that in India similar studies would be taken up in the near future to locate our reserves of ability and to provide them the adequate learning experiences.

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Women's Education in India

Education of Women in India (1921-1966)
Lakshmi Misra. Macmillan & Co. Ltd., 1966.

In recent years, the education of girls and women has attracted everyone's attention. Their education is a great asset to any country and its importance in a developing country like India can be ignored only at the greatest peril to the future progress and prosperity. The changing situation, scientific inventions and technological innovations, the terrific expansion of life's activities and the explosion of human knowledge and, above all, India's determined pledge to plan her progress through the Five Year Plans and create a socialistic pattern of society producing democratic citizens, have given a new horizon and colour to the problem of women's education in India. The education of girls and women is no longer ridiculed; on the other hand, it is appreciated, encouraged and considered a necessity for harmonious development. In this regard, there has been no systematic study in this country. Probably, Lakshmi Mishra's work is the first study in this field.

The book under review is divided into nine chapters. Under Introduction, the author has explicitly described the objectives of this study as being "to study the history of women in India in the context of their status and education", "to survey and analyse their education from 1921 to the end of the Third Plan" and "to suggest some constructive action in this regard". According to the author the reasons for taking this particular period for the study are, "political citizenship for women", "electoral franchisement by the provincial legislature", and "ambitions of intelligent women" after some had become ministers and speakers. The incorporation of other factors like the call of Gandhiji to join the freedom movement, a general awareness among middle-class women, and the desire to uplift the socio-economic conditions would also be considered relevant. The political reasons, like electoral enfranchisement or political citizenship, only accelerated the process that had already gained momentum in the first decade of the present century.

The second chapter briefly describes the Status and Education of Women during various periods of the nation's history—ancient, medieval and modern. The social status, marital status and the religious status of women during these periods have been briefly discussed and in this the author has explicitly quoted from different documents. The accounts given in this regard are, however, of a general nature. Perhaps the authoritative works on education by R. P. Mukherjee and N. N. Law needed reference while giving a detailed account of the status of women. Again, the author has made no mention of the great universities like Nalanda, Taxila and Vikramsila. Also, the education of women and the Sudras in the fine arts, music, dancing and drama, during the Vedic and Buddhist periods have escaped due notice.

While dealing with the period from the advent of the British to the India Act of 1919, a little political and social background could have made this chapter more interesting. This chapter is however more systematic and better organized than the previous ones. It contains certain statistics, figures and information. On page 33, the author has mentioned that owing to the efforts of Pandit Iswar Chandra Vidyasagar some girls' schools were opened in United Province. Pandit Iswar Chandra was a man of Bengal and his field of activity was confined to that province (specially Midnapore and Bankura districts) and not the United Province (then known as North-Western Province). While the author, through various facts, figures and statistics has tried to justify that the period "witnessed tremendous changes in the social and educational fields", and these changes enabled women to participate in the fothcoming national movement, she does not mention what these changes actually were. There seems to be another discrepancy on page 48 where the author mentions 81 training schools for women with 1383 pupils in 1901-02. The Report of the National Committee on Women's Education, 1959, published by the Ministry of Education at pages 20-22 states their number to be 45 and 1253 respectively. Moreover, it would have been much better if these tables had been divided into two sections, Private and Public, further subdivided into Arts and Science colleges, Professional colleges, Secondary schools, Primary schools, Training schools, Vocational schools, etc. The author has probably forgotten to mention the contribution of Annie Besant in establishing the Central Hindu Girl's School at Banaras in 1904 with the objective of imparting Western education to girls quite separately from boys in a modernized Hindu school. The vital role of the missionaries in the spread of of education among girls has been ignored by the author.

In the next chapter, the author has discussed in brief the different forces that influenced the rapid growth of education among girls and women and different organizations that helped it during 1921-1937, with some facts and figures. A statistical survey of different States has been given and some of the problems like wastage and stagnation at the primary stage, co-education, women-teachers, have been dealt with. This chapter is further enriched with some relevant figures regarding finance, administration and evaluation. Had a comparative study with interpretations been attempted it would have been more valuable for purposes of educational research. Discussing wastage at the primary stage, the author has been content with the figures regarding girls, forgetting boys of the same age-group, and students in general. It would have been a valuable document had the author consulted the Progress Reports of different provinces instead of depending entirely on the Quinquennial Reports of the Government of India. In the States of Bengal, Bihar and Orissa, Zennana Schools were organized during this period for the education of adult women and village women; peripatetic women-teachers were appointed. Such steps, however insignificant, cannot be ignored and are milestones in the spread and popularity of education among women. At places while a lot of statistics have been provided, their interpretations, influences or reasons etc., are not fully brought out. At the end, however, the author has evaluated the whole pogress and enumerated some problems.

Chapter V, Education of Women during the Provincial Autonomy (1937-47), follows on the lines of the previous chapter, with a large quantity of information. The author has mentioned various schemes undertaken to give an impetus to education in the various provinces.

Chapter VI is entitled Education for Women from Independence to the First Plan Period (1947-1956), while the subsequent chapters deal with the Second and Third Plans. The author has rghtly pointed out the emergence of middle-class women into the various fields of nation-building activities and the consequences. The author has given the State-wise progress of education during this period although one misses a comparative study and interpretations showing the probable causes of the *rise or decline of* women's education at different periods and in different provinces. The author has clearly stated the provisions for women's education in the Reports of the University Education Commission, the Secondary Education Commission and the Plans and their progress. The author has incorporated the recommendations of the various committees, commissions and bodies regarding the various stages of education—primary, secondary and university education, social and professional education, the National Committee on Women's Education and the Indian Education Commission.

In the concluding chapter, Retrospect and Prospect, the author mentions the steps taken by the Government of India to solve the various problems that arose during 1921-37, but has not assessed the achievements reached in these fields. Also, no suggestion for constructive action has been offered by her as proposed in the objectives of the study. The author has, however, posed some more problems to solve, e.g., the disparity between the education of boys and girls, prejudice, economic conditions, dearth of women-teachers and proper emphasis on the teaching profession.

In brief, it can be said that this book is a fair review and a detailed survey of the progress of women's education containing facts, figures and information. Being the first authentic book on women's education in India, the author deserves congratulations from all students and lovers of "education" for this contribution to the educational literature of the country. This book should also be welcomed as a sign of the fact that academic people in different fields of education have begun taking interest in the different branches of the discipline. The book has plenty of good ideas and information and food for thought and suggests problems for further research also. We need more disciplined work in the field of women's education which should be based entirely on research and original documents and not be simply descriptive.

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School Organization and Student Achievement

School Organisation and Student Achievement: A study Based on Achievement in Mathematics in Twelve Countries.

Neville Postlethwaite, Almquist & Wiksell, Stockholm, 1967.

The present work draws its data from the International Study of Achievement in Mathematics[1] wherein achievement of student populations was studied in 12 different countries. Along with achievement, information was also obtained on various input variables related to school organization, curriculum and methods, as also some characteristics of schools, families and societies. The present study analyses the relationship between the school organization and achievement in mathematics.

It is necessary to add a few comments on the parent study as it is in light of acceptance of the design and tools of that study that the findings and conclusions of the present study can be evaluated.[2] The author himself has devoted fifty per cent of his writing (63 out of 131 pages) to the description of the main study.

Although competent efforts were made to control unwanted variables and eliminate flaws, the problems of working through the media of many different languages, varied systems of education, and a variety of cultures, were not all easy to overcome. The most difficult thing here was to make tools of measurement which would be fair to all. The statement (Vol. I, p. 84) that "the syllabi do include a large body of content which is common to all nations" is questionable in that, beneath broad headings of topics, how what is actually taught may be quite different. The addition to this situation of non-overlapping parts of the syllabi renders the conclusions from these comparisons very tentative.

Nevertheless, in the reality of this and other similar problems, the project was well designed and even if the cautious reader would hesitate to accept the findings as established, he would be ready to accept them as tentative—to be verified. Incidentally, the IEA team is going to present these verifications in another two to three years in their complementary studies of comparisons in achievements in science, mother tongue and literature and later also in civics and French and English as a foreign language. The problems of developing common tools in areas other than mathematics and science are going to be many more, and the students of comparative education would await with interest and anxiety, the outcome of the second and third phases of the project. It is from these duplica-

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1. Torsten Husen (Ed.), *International Study of Achievement in Mathematics*, New York, John Wiley & Sons, 1967.
2. See also review of the main study in *Indian Educational Review*, *Vol.* 3. *No.* 1, January 1968, by S.S. Kulkarni.

tions that some of the evidence of stability of the findings of the parent study as well Postlethewaite's work would be established.

Investigations of this kind are a breakthrough in the comparative study of educational systems. While educational planners and administrators may take decisions in respect of various educational matters—they may also present rational arguments for their decisions—these are rarely based on actual findings as the same are difficult to obtain. There are a large number of areas, specially the ones dealing with human beings, where experimentation seems to be forbidden or too difficult, if not impossible. Cross-national studies provide some ready data—even if not controlled in as many aspects as the most fastidious experimenters would demand—to support or otherwise some of the rational thinking as also popular beliefs.

The findings in this study, even if they remain to be verified, would be of great interest to the Indian reader where educational policies are still taking shape. The main findings of the volume under review are discussed below.

After examining the performance of the students in the light of the retentivity of various systems, Postlethewaite reports: (1) Countries which retain larger percentages of an age-group to the pre-university stage produce, on an average, lower standards of achievement than do countries retaining smaller percentages; (2) An increase in the in-take into pre-university year does not necessarily cause a drop in the levels of the best students; (3) In general, systems with higher retentivity have greater yields (how many brought how far). The first finding is in line with general thinking, though it may not be generalized beyond the scope of the work. The finding is froma group of 12 countries all which can be considered as developed, technologically, and all of which have a universal system of education. Retentivity here may be more clearly related inversely to the ability levels of the students while same may not be the case with developing and fast-changing nations where economic and social-cultural variables may be affecting retentivity to a large extent. The second finding is of importance in the light of the fears of many teachers—specially teachers in colleges and universities who believe and argue that if more, and hence poorer, students are allowed through, the standards of performance will deteriorate and the learning of better students will suffer. This reviewer is not happy about the idea of 'yield". Education is not a commodity where quality and quantity can be multiplied. A high yield as a product of medium achievement of a large number of pupils is not the same thing as a high yield obtained from high level of achievement of a small number of students. Also, "yield" would remain a function of retentivity which may be controlled by economic and political factors in turn.

The second set of findings deal with inter-school and intra-school differentiation. These have been studied with the spread of scores. Ability grouping—whether in inter-school or intra-school differentiation—is associated with large standard deviations. The author has obviously felt that talking of correlation between the size of standard deviation of the scores and an index of ability grouping practised by the schools was perhaps not very meaningful to the average reader in the area of education. The idea has therefore been clarified in a special section on 'implications' in this chapter. The implication derived from this as well as by quoting other research is that while 'good' students are not pulled back by 'poor' students in the same school (or same class), the poor student deteriorates when left alone. The finding is important for the school administrator as well as for admission policies. Nations must be cautious in diverting or concentrating the top talent among their student populations to a few courses (like the sciences and technology in developing countries) and a few selected schools. This may increase the gap between the 'haves' and the 'have-nots'.

The last chapter deals with the relationship of achievement (in mathematics only in this case) to specialization and age of entry to school. The two findings are: (1) studying a smaller number of subjects (at the pre-university stage) does not lead to higher achievements; (2) the achievement in mathematics is not affected whether children start school at the age of five or six, whereas the loss of a year's schooling between six and seven appear to have a detrimental affect. The first finding is contrary to expectations. There may be many uncontrolled factors in the situation. The tests, having been developed on a kind of common core of syllabi, might never have touched the areas of content which the specialization groups study; the existence of this feeling on the part of the English mathematical educators has been mentioned by the author. There are only three countries where students pursue a small number of subjects: England (the smallest number), Scotland and America. Four subjects in the United States in Grade XII may also mean a different story in the sense that the subjects studied in Grade XI may be different from the ones studied in Grade XII. Even with these comments the possibility of 'learning more' if required as in countries where nine subjects are studied (and there are seven of them) cannot be ruled out.

The second finding if verified in future work, would be of great significance as it would tend to establish the optimum age for formal schooling (at least in developed societies).

It may be added once again that one would have to wait for further work, even if by IEA again, to have complete faith in these findings. These need to be confirmed over larger areas of achievement.

It may interest the reader that in the second and the third phases of IEA studies, many from among the developing countries have also joined in—making the total task more complex, and thereby more challenging. The joining in of some Asian countries (other than Japan) would tend to bring to the forefront economic, motivational and cultural factors that are associated with achievement.

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Children Know More Today

Rising Standards in Scottish Primary Schools, 1953-63.

The Scottish Council for Research in Education, University of London Press, London. 1963.

How has education responded to changes in society? Has there been any measurable change in the ability and attainment of children in a given number of years? If so, in what direction? These questions have received the attention of educationists during the last twenty-five years and national surveys have found a prominent place in the research programme.

The Scottish Council for Research in Education was one of earliest to undertake such a programme. As early as 1932, they conducted a survey of the intelligence of Scottish children. It was repeated in 1947 to assess the trend of Scottish intelligence. This was primarily to see if the disturbed state of society during the World War II has had an effect on the ability level of the children, then in their most formative years. The report which was published in 1949, showed that children living in urban areas had a rise of 3.2 I.Q. points over their 1932 figures, whereas for those in more remote areas, the rise was only of 0.4 I.Q. points. In 1953 the Scottish Council further carried out a survey of attainment of Scottish ten-year olds in English and arithmetic.

Subsequently such surveys gathered momentum in other countries and also in international organizations. The Ministry of Education, Japan, conducted a national survey of mathematics achievement in its country in 1956, the report of which was published in 1960. The OSCD has published report of a survey of mathematics achievement in twelve countries. The UNESCO also completed a survey of mathematics achievement in 12 countries in 1963, and the report is available now. In India, NCERT has completed the Mathematics Achievement Survey in 17 States, the report of which is now ready.

The Scottish Survey

The survey of attainment in English and arithmetic conducted by Scottish Council for Research in Education is however of special interest because they have been able to repeat the programme after a period of ten years and give a comparative account.

Aim of the 1963 Survey

The aim was primarily to assess the scholastic standing of the ten-year-old in Scotland. It was hoped that the survey would not only indicate the changes in attainment that might have taken place in the ten intervening years, i.e., between 1953 and 1963, but that this new survey might also give some indication of the possible effects of new teaching methods on the attainment of primary school children.

The Sample

The 1953 survey was carried out on the entire ten-year-old population, numbering about 76,000. It had the advantage of eliminating the sampling error but also the disadvantage of added efforts, both at the administration as well as at the analysis stage. In the 1963 survey therefore the sampling technique, involving only about 175 of some 2700 schools and about 5000 of the 82,000 pupils of the age-group ten in Scotland in that year, was employed.

A type of stratified random cluster sampling technique was followed in which a sample of schools was first drawn and every pupil, irrespective of sex, in the age-group in that school was tested. The strata used for selection of schools were: (a) size of the school, and (b) type of area—(city, large town, small town, etc.). The nature of management—grant-in-aid, independent—was placed as a separate category. Every fifteenth school in this classified list was selected.

On statistical grounds, the committee conducting the survey, has accepted the inefficiency of this cluster sampling of the type used. The statistical tests showed that in order to obtain the reasonable degree of precision in estimate of the mean score of the whole population of ten-year-olds, about seven times as many pupils were required for the cluster sampling as would have been sufficient if simple random sampling had been used. But under the circumstances cluster sampling only was practicable.

The distribution of the children in the sample over the different school classes brought out an interesting fact of educational significance. The ten-year-olds as a whole were more advanced in 1963 than they were in 1953, there being a higher proportion in class PVI and a smaller proportion in class PIV. On the other hand the proportion of ten-year-olds in class PVII was slightly less than it was ten years earlier. It seems that the very bright child was not being advanced beyond his age-group to any greater extent than was the practice ten years previously.

The Tests

The tests were the same as those used in 1953 survey. They were attainment tests covering the two main school subjects in the primary classes, viz., arithmetic and English.

(a) Arithmetic Test.—It had two parts each with a separate time-limit. Part I (Mechanical Arithmetic Test) comprised 30 open-ended items dealing with: (i) the concept of number, and (ii) four fundamental operations of numbers, money, weight, measure and time. It was like any Mechanical Arithmetic test.

Part II (Arithmetical Reasoning Test) had 34 open-ended items of the type usually written for arithmetical problem tests. In these the application of the concept of numbers and the four fundamental rules to the actual life situation was required.

(b) *English Test.*—This had also two parts each with a separate time limit.

Part I (English Usage Test) had 13 sub-tests with varying number of items. Some were multiple-choice items whereas others were open-ended ones. Each sub-test sought to test the knowledge of a particular aspect of grammar and its rules like: (i) use of appropriate preposition or adjective (ii) different forms of verbs, (iii) parts of speech, (iv) use of punctuation and capital letters, (v) structures of sentence, (vi) spelling, etc.

Part II (Comprehension Test) had six parts, each with one text generally in the form of a passage and followed by some items based on it either in the open-ended or multiple-choice form.

The tools had been developed along scientific lines for the 1953 survey. However the items were further studied for the 1963 data by taking a random sample of 100 scripts. The over-all picture of the items on the two occasions were markedly similar.

General Findings

The 1963 data brought out some facts of special interest to teachers and parents. They are as follows:

1. Along with increase in the number of correct responses to the different items in the Mechanical-Arithmetic Test, the nature of errors had changed somewhat. There were proportionately larger gains, on items dealing with vulgar fraction and tables of measure. Even in Arithmetic Reasoning Test the gain was proportionately bigger for items with tables of measure (capacity, length, weight, etc.). This could perhaps be attributed to the increased use of practical work-cards and the greater opportunities given to children to use measuring apparatus in schools between 1953 and 1963.

2. There was considerable reduction in the number not answering different items. This suggests an increased speed of children in performance of such tasks. This again could be attributed to the changed method teaching during the period 1953 to 1963.

3. There was relatively greater improvement in the language comprehension test than in the grammar one. It suggests that there was no special emphasis on formal grammar during 1953-1963.

Results

1. *Difference in Achievement.* There was definite and statistically significant gain in scores in all the four tests between 1953-63. It was roughly comparable to an increase of 5.I.Q. points or to a gain of about four months of progress of the average pupil. There was no evidence to show that this gain was purely an academic one. It might have been partly due to the improved textbooks used since 1953, which have objective-type questions in them.

2. *Increase in Score at Different Ability Levels.* The data showed that pupils at virtually all levels had contributed to the gain. It is interesting to note that whereas the individuals at 10th percentile level showed very little gain in the arithmetic tests in comparison to those at higher level, the position was just the reverse for English Usage test.

3. *Sex Difference.* There was no significant difference between the gains made by the two sexes. Boys and girls had improved equally during the ten years.

4. *Gains in Different Areas.* The areas in which the schools were located, were classified as cities, large towns, small towns and 'Others'. The children from the area categorized as 'Others' showed comparatively higher gains than others, the difference being statistically significant. This was particularly marked for the English Usage test. This 'Others' covered the rural areas. It indicates greater improvement of institutions and instructions in these smaller places. The distribution of the level of ability of the children in these areas has not been given, so one cannot, for certain say, that the children at the 10th percentile level who showed highest gain in the English Usage test, referred to above, belonged to these areas only.

5. *Regional Difference.* Because of the small size of the sample in the ten regions in which Scotland is divided, no valid conclusion could be drawn in this regard.

6. *Gains in the Schools of Different Sizes.* Here again, because of the small size of sub-sample no meaningful conclusion was possible.

7. *Effect of the Cuisenaire Method on Test Scores.* There had been an increased use of the Cuisenaire method of teaching arithmetic in the primary schools. But the Cuisenaire pupils showed below-average performance in all the four tests. The possible explanation seemed to lie in the fact that the arithmetic tests gave little or no scope to the pupils with Cuisenaire experience to show their abilities in the kind of thinking fostered by the method.

8. *Other Findings.* An attempt was made to study the relationship of the gain with variables like methods of transfer of children to secondary schools, library facilities, items-content, shortage of teachers in the schools length of schooling, left-handedness, etc., but the data were inadequate to eliminate the possibilities of any third common factor influencing the results.

Educational Implication

During the recent years there have been heated debates in various circles as to whether the scholastic achievement of pupils is rising or declining. One group strongly holds that the children today know very much less in comparison to what their fathers knew at that age. Others hold the contrary view. These debates, however, are not always based on reliable data. Now with the explosion of knowledge which necessitates providing such learning experience to the children that they can acquire very much more within the limited and more or less fixed time at their disposal, it is all the more important that we estimate the changes that are taking place in our children's abilities and attainments, and plan their educational programme accordingly. A survey helps in assessing the differences between different sub-groups and laying norms for them. But it is only if the survey is repeated at intervals that one can know the changes and can locate the factors causing those changes. Careful and planned manipulation of the factors can help the educationists in bringing about changes in the desired direction. Educational objectives to be laid down for the coming years can thereafter be worked out on realistic and valid grounds.

Need for Achievement Surveys in India

Phenomenal changes in the field of education have taken place in India during the last twenty-five years or so. With the provision of universal primary education in the constitution, not only the number of children in the schools has multiplied but the school population is very much more heterogeneous now than it was even before. The curriculum has expanded to include new subjects like sciences, social studies etc. The facilities in the institutions for handling the added responsibilities however do not seem to have increased in the same proportion. The teachers have therefore, a very much more difficult task to perform today than was required of them earlier. As for the Indian child, he finds himself growing under a multitude of forces—social, political, economic and others very often acting in contrary directions. The demands on him in the intellectual field and also elsewhere have grown in dimensions which are not easy for him to meet. Have these affected the abilities and attainment of our children? If this were known effective manipulation of the teaching learning situation to keep to the desired standard within the limited resources and facilities could be attempted.

A beginning in educational surveys has already been made in India. As referred to earlier, Mathematics Achievement Survey at three levels—Primary, Middle and High has just been completed. It reports disappointing performance with regard to the agreed objectives, in almost all the States at all three levels and a wide disparity between different States and also between the rural and urban children in the same State. This naturally sets the educationists, and more so, mathematics-teachers a—thinking. With careful planning of the curriculum textbooks, teaching aids, and technique of teaching and evaluation of mathematics on the basis of regular feedback data, a very different picture may emerge in the next survey. India's participation in the International Project of Mathematics Achievement Survey might have thrown additional light on our problem. It may however, be mentioned that India has joined the UNESCO project of International Achievement Survey in language and general science.

If India is to bring about qualitative improvement in education it would not be enough to implement the recommendations made by the Education Commissions and other education committees set up for the purpose, but the result should be scientifically evaluated at regular intervals, to **ascertain that the changes** are bringing about the desired results.

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Conference on Testing Problems

Proceedings of the Invitational Conference on Testing Problems.

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This publication is a compilation of papers read at a one-day invitational conference on testing problems organized by the Educational Testing Service on October 28, 1967 under the Chairmanship of Professor B. S. Bloom of the Chicago University. The foreword has been written by Henry Chauncey, President ETS and the preface by Professor Bloom. The Conference had three sessions. Each session had a separate theme—Session I: Evaluation and Research in Curriculum Development; Session II: New Approaches to Instruction; Session III: Measurement System. The luncheon address was delivered by William Gorham of the U.S. Department of Health, Education, and Welfare on Testing and Public Policy.

The selection of speakers was done by Professor Bloom. His main interest being in the relation between learning and testing, "speakers likely to focus on these relations" were selected.

The first speaker Robert Glaser of the University of Pittsburg spoke on "Adopting the Elementary School Curriculum to Individual Performance". The need for "individualizing instruction" has been emphasized for quite some time but few if any striking results have been reported. The Learning Research and Development Centre at the University of Pittsburg has been trying to develop procedure which has come to be called "individually prescribed instruction". Six basic requirements have been spelt out for promoting individual progress. They are: the freedom to the individual to move at his own pace, sequential development of objectives, continuous assessment of abilities and accomplishment, providing students with materials appropriate for self-directed learning, adequate professional training of the personnel for the purpose, and attending to and utilization of detailed information about each individual. He then discussed the need for the definition of educational objectives. According to him,

> 'The process of classifying goals, working toward them, appraising progress, re-examining the objectives, modifying the instructional procedures to achieve goals, and clarifying the objectives themselves in the light of experience and data should be a continuous process.'

Assessment diagnosis are another important aspect of a programme of individualizing instruction. The problem of accumulation and maintenance of day to day records is really a huge task which is being tackled with the help of computers. The other two aspects that Glaser considered essential for individualizing instruction were those of adapting instructional materials and methods to the needs of individual learners and a change in classroom communication structure wherein "the responsibility for teacher-student communication fell upon the student." He then discussed some patterns of student progress and drew the following conclusion:

> It is conceivable that individualized instruction will find its major value in attaining not only achievement objectives but other educational goals such as self-direction, self-invitation of one's learning, and the feeling of control over one's learning environment.

He has also given an important hint in the following words;

> As I have indicated, the first step is for the schools to allow extensive redesign of their curriculum and instructional procedures, and once this takes place, to be disabused of the notion of instant progress through innovation, and to permit sustained study of the variables and effects involved.

Learning is essentially an individual activity. If even when on the basis of tests it is found that two individuals are very much alike in their pattern of abilities, there is no guarantee that they would react in the same way to a common programme of instruction. What happens in a classroom, where 50, 60 or sometimes even 70 students with varied levels of achievement and widely different personality make-ups are put together to receive instruction at the hands of a teacher who has little knowledge of their individual needs and protentialities and who pitches his lessons not at any particular level but carries on the job in a more or less conventional and mechanical fashion, leaving learning to take place in the students rather incidentally, can well be imagined than said. The study referred to in the above paper is a refreshing rejoinder to all who are protagonists of large classes and uniform instruction. It may not be possible for a long time to put into practice computerized individual instruction in this country, but what is needed is the recognition on the part of both the administrator and the teacher that individualizing instruction is a feasible proposition and conditions suitable for the same need be created in our schools as far as possible. The teacher should not remain satisfied with teaching the syllabus. What is needed is a thorough overhaul of our classroom practices even within the limitations of prevailing conditions.

Christine H. McGuire of College of Medicine, University of Illinois, the second speaker in Session I. described "An Evaluation Model for Professional Educaiton—Medical Education." The Office of Research in Medical Education of the University of Illinois, College of Medicine, conducted a study in 1959.

> Some of the findings of those studies supported the view that the then current system of student examination, grading, and promotion not only failed to provide evidence regarding student achievement with respect to many of the most important goals of medical education, but that it actually jeopardized their attainment by exacerbating tendencies toward fragmentation of learning, by focusing student attention on esoteric or trivial detail, and by intensifying unhealthy competition among students for grades and among departments for students' time and attention.

The faculty committee of student appointed for the purpose developed objectives of education in the three already familiar—cognitive, affective, and skills—domains.

> It was decided to rely on comprehensive written examinations to measure the cognitive goals and some of the skills and to use practical laboratory and clinical examinations to measure other of the psychomotor skills. Habits and attitudes were to be assessed by systematic accumulation of anecodotal records in whatever quantity individual faculty members felt able and willing to supply them.

An effort was made to provide for longitudinal integration, in comprehensive examinations developed for evaluation. Subcommittees were appointed to develop items for inclusion in pools of items. Each item accepted for inclusion was "coded according to both the content and the cognitive process which it purportedly samples." The final step in the preparation of each examination was to determine the "Minimum Passing Level" represented by "expert estimate of the chances that a barely passing student would have of selecting the best answer to that question." Defective questions were sieved out before reporting officially the results of any examination. Regular feedback was also built into the system. It had helped students understand clearly the important goals. "The character of the examinations has helped students to focus their attention on learning to apply the vast body of knowledge they have acquired." Fixing of expected standards and a third party evaluation of students against them helped in developing more mature relations between students and instructors. It appears to be an argument in favour of external examinations. It is doubtful whether any research is available to bear out the above assertion. Moreover, to a firm believer in the philosophy of evaluation as an integral part of the educational process this thinking would look rather anachoristic.

McGuire described another evaluation model developed through "Research on Assessment of Professional Competence." "The first stage of the research was devoted to a determination of the essential components of competence in the specialty under study; the second, to an investigation of the adequacy of current certification techniques as measures of these components, and the third, to the development of instruments that would yield more relevant, valid, reliable, and, comprehensive assessments." A critical incident study was made to determine the essential components of professional competence. Analysis of written examinations revealed that 'fewer than 25 per cent of the questions were thought by an expert to involve even simple elements of interpretation of data or familiar problem solving. Analysis of observations of oral examinations revealed "(a) that these oral examinations measured predominantly the candidates' ability to recall (rapidly and under stress) isolated fragments of information; (b) that candidates only rarely cited evidence for their answers; and (c) that standards employed in judging performance were not always clear nor were they uniformly applied" In the third stage of the study techniques were developed "to measure previously neglected aspects of professional competence." Supervisors' ratings were being used as validating criteria. A ten-year follow-up was being planned to determine the predictive validity of various measures of competence evolved in the study.

A third model for which McGuire referred as model for self-study was only cursorily touched upon in this paper. It has been fully described in an excellent monograph by Dr. Paul Sanazaro, recently published by the Association of American Medical Colleges."

The models described by McGuire are scientifically conceived and are very comprehensive in approach. They provide useful guidelines to workers in the field of examination reform in India. The first model is essentially on the pattern of an external examination. Only time will determine how far it is going to succeed. Unless evaluation by teachers is made more scientific and is utilized for the final evaluation of students, the evaluation done by experts other than teachers, howsoever comprehensive it may be, is not likely to reflect a high measure of validity. Another important issue facing teachers and evaluators alike is to determine the contribution of non-cognitive processes in the final success of the individual in a job. An answer to this question has not been provided in this report. Let us hope that the ten-year follow-up study as planned above will provide some answer to it.

The first paper in Session II was read by Richard C. Atkinson of Stanford University. It was entitled "Computer-based Instruction in Initial Reading." The speaker referred to three types of programmes at three levels of student-system interactions. The simplest one is the linear sequencing of problems, the most complex one is the "dialogue" programme, while the "tutorial" programmes lie somewhere between the two. The CAI (Computer Assisted Instruction) programme used in the project followed roughly the following sequence of events: "The computer assembles the necessary commands for a given instructional sequence from a disc—storage unit. The commands involve directions to the terminal device to display a given sequence of symbols on the CRT (Cathode Ray Tube) to present a particular image on the film projector, and to play a specific audio message. After the appropriate visual and auditory materials have been presented, a 'ready' signal indicates to the student that a response is expected. Once a response has been entered, it is evaluated and, on the basis of this evaluation and the students' past history, the computer makes a decision as to what materials will subsequently be presented. The time-sharing nature of the system enables us to handle 16 students simultaneously and to cycle through these evaluative steps so rapidly that from a student's view point it appears that he is getting immediate attention from the computer whenever he responds." A curriculum in reading was developed and implemented in around 1963. The data were still under analysis when the paper was presented. However, some results that had been tabulated indicated that this curriculum was responsive to individual needs. Several reports indicated that "the reactions of students, teachers, and parents to the programme were quite favourable." Suggestions for very many new experiments have also emerged.

It is a good example of the application of educational technology to classroom instruction. The speaker did not give any idea about the cost per head for such a programme. Other questions to be answered are "How does it compare with the learning that takes place in a teacher assisted instructional situation? What about the concomitant desirable outcomes of a dynamic interaction between a competent teacher and his/her pupils?" Some experiments under strictly controlled conditions would be helpful in providing answers.

The second paper in Session II was on "Academic Games and Learning" by James S. Coleman of Johns Hopkins University. In this paper Coleman has tried to bring out clearly the difference between academic "*simulation games*" and "other ways of teaching and learning." The essential properties of a game have been described as follows:

> 1. Its basic elements are players or actors, each striving to achieve his goals; 2. it is limited to a small, fixed set of players; 3. its rules limit the range and define the nature of legitimate actions of players; 4. again, through the rules, it establishes the basic order, sequence, and structure within which the actions take place; 5. it is delimited in time as well as extensivity, with an end defined by rules; and 6. its rules constitute a temporary suspension of some of the ordinary activities of life and rules of behaviour by substituting for them these special time-and-space delimited ones.

According to Coleman, the school works on the assumption that the child is already motivated to learn and what it has to do is to transmit information and aid learning by repetition. It ignores the basic fact emerging from the theoretical work done by psychologists that "the two essential properties of the learning context are action in an environment and reward; the learner is always *learning to act by acting*. Furthermore, it is important to note that the learning is *incidental* to his goal; the goal is not learning itself .. .. Thus, while *psychologists consider the most essential step as learning to be motivated to act in a given direction, to achieve a given goal,* the school is seen to operate under the assumption that a child *is already motivated* to learn mathematics or history or English literature. Games lead to learning of certain structures and the information, when it is assimilated is not merely 'learned', it is fitted into the structure of action in such a way that it facilitates achieving a goal". According to Coleman, "Play in a game is not a self-contained activity but one that is complementary to the verbal discussions and information transmission of which most school activity is now composed." He also gave an illustration to show how such games are played.

The use of games as a teaching device is a fairly old practice. Coleman has tried to draw attention to some of the heretofore neglected potentialities of this activity. A good teacher, who is well aware of the objectives of instruction and who appreciates that "learnability" should receive greater attention than acquisition of information, would always utilize games like any other device, to fix and facilitate learning in his pupils. What he needs is a correct understanding of the processes to be developed in the students, a thorough grasp of the content to be transmitted, and a good mastery over the various devices which he may profitably use for effective teaching and learning. In such a situation objectives occupy the central position, while games become one of the many devices to bring about desirable and worthwhile changes in the pupils.

William Gorham of the U.S. Department of Health, Education, and Welfare in his luncheon address entitled "Testing and Public Policy", made two very significant points. Firstly, he drew attention to the lack of information about the relationship between student performance and the resources that go into education. Secondly, he felt that "our best hope for improving the performance of the educational system lies in improving the incentive and the capacity of the system itself to learn." According to Gorham an essential aspect of education is to take care of some of the intangible outcomes also. Cheating at examinations is very common. Still worse is that a large fraction of cheaters consider it "perfectly all right" "A society which ignores this sort of outcome of its educational process is half-way down the drain." Another intangible outcome needing attention is "self-esteem—the way kids feel about themselves and their ability to influence their future." He advised that measuring of such outcomes was one of the most important challenges to the testing community. Decisions regarding better education involve teachers, principals, superintendents, school boards, state agencies, legislatures, federal agencies, and the Congress, and unless they learned to learn by their mistakes and to bring about systematic modifications in their methods, there could be little hope for education. "....real progress toward improving education will come only when a substantial number of teachers and educational administrators at all levels see themselves as involved in a continuous learning process."

Gorham's rejoinder to planners of education as also to those responsible for its execution is very refreshing. As the outcomes of education can not be measured tangibly and as also there are no methods available at the moment to find the relationship between quality and cost in education, nor are there any to isolate variables responsible for the observed shortfalls every one involved in the process can safely absolve himself of the responsibility by shifting the blame to others. While referring to the problem of cheating by students, it would have been better if a reference to society was also made. No doubt, if students consider cheating as an approved practice there is something wrong with the educational system, but the reviewer considers that the society in which this practice is tolerated and implicitly approved is already "halfway down the drain." It is a social evil and the whole society rather than the institution of school alone should take measures to remedy it. The earlier it is recognized even in this country, where this problem is in no way less serious, the better for the future of education.

The first paper of Session III was "Sample-free Test Calibration and Person Measurement" by Benjamin D. Wright of the University of Chicago. In this paper, the author tried to provide answer to two genuine difficulties of a student of educational measurement, viz., dependence of measurement units on (1) the test and (2) the group. He advanced methods of person-free test-calibration and item-free person measurement. These methods were first discussed by a Danish mathematician Georg Rasch. Wright rightly pointed out that an "objective" measurement is possible only when two conditions were satisfied, "firstly, the calibration of measuring instruments must be independent of those objects that happen to be used for calibration. Second, the measurement of objects must be independent of the instrument that happens to be used for measuring. By expressing ability in terms of log, Wright has demonstrated how two groups, very different in abilities, can be calibrated on the same scale. Similarly, it has also been demonstrated that the same calibration holds good for both easy and hard items. The measuring model for item-analysis which made the item-free person measurements and person free test calibrations possible is like this, "The odds in favour of success, O are given by the product of the person's ability, Z_n, and item's easiness, E_i

$$O_{ni} = Z_n E_i$$

This is the same as saying that: the probability P_{ni} that a person with ability Z_n with succeed on an item with easiness E_i is the product Z_n E_i of his ability and the item's easiness divided by one plus this product

$$P_{ni} = Z_n E_i (1 + Z_n E_i)$$

The speaker felt that unless something was done to develop such objective measures, there is not much hope for the development of a science of measurement of human characteristics.

Wright has suggested two ways of refining the unit of measurement in his model. It can be done by selecting a group of items as standard or alternatively a group of persons as standard. These involve dependence of the unit either on items or persons. Moreover, the ability that the selected group of items would purport to measure can be defined only in terms of the items that are selected as standard items for measuring it. In physical measurement a characteristic is inherent in an object and different scales are used to measure it, which provide different measures of the same characteristics. Methods are available to convert different measures of the same characteristic from one scale to another. Does it hold good for Wright's models or, for that matter, in case of any model of the measurement of human characteristics? The definitions of a standard set of items or a standard group of individuals will vary from culture to culture which is not true about a standard measure of length. Adaptability in the latter case is readily possible. It is not so in the former case.

The next paper in Session III was on 'Reformation through Measurement in Secondary Education' by Paul R. Lohnes of the State University of New York at Buffalo. Lohnes opened his address by drawing attention to the fact that measurement practices, which have reached a considerable level of maturity, are not ends in themselves but are supposed to further the purposes of schools, and, therefore, by bringing about desirable changes in these practices it may be possible "to change the accomplishments of our schools in desirable ways." According to him, the present measurement practices are far from satisfactory. His

> contention is that the measurement record attached to students in most of our secondary schools today is inadequate and harmful; that it involves

> errors of commission by sponsoring invidious comparisons, burdening teachers, and erecting a barrier between the teacher and the student, that it involves error of omission by ignoring important traits of individual differences in adolescents and providing inadequate interpretation of the traits it does report.

He then went on to state some goals of education based on a "theory of personality that emphasized the individuality of persons." Basing his findings on factor-analysis, he found two sets of factors to be reckoned with. Six of them are in the domain of abilities while eleven in the domain of motives. According to him, measurement should not be used to give grades to be used as incentives. It should be used for prognostic purposes validated by follow-up researches. He, therefore, recommended that "grading of students by teachers be eliminated. Periodic appraisals of students would be conducted by a system of uniform measurements. Grading violates transactionalism by forcing the teacher to exhibit disrespect for the student's individuality. Grading not only denies the uniqueness of the student, it lends itself to the substitution of extrinsic for intrinsic learning motivation. Removing the grading assignment from teachers to some other agent such as the Regents or a computer will not solve the problem if the student perceives a continuing emphasis on invidious comparisons such as class rankings. He will still blame the teacher for being a party to such treatment of him........The teacher should lead and help students, not judge them."

> The prognostic outputs of the measurement system would stimulate and assist the student in understanding his predicaments and planning his initiatives ..This measurement system would support the exploration of potential careers and the learnings required to qualify for them,

This emphasis has come from Project Talent Search.

This is a stimulating paper as it has emphasized the measurement of motivational characteristics in addition to the cognitive ones. The purpose of education being "to equip the student with conceptual tools to enhance his understandings of himself and his peers," it cannot be accomplished unless the individual develops harmoniously in varied dimensions. Education can truly discharge its function only when it takes care of all these dimensions of growth. In his enthusiasm for emphasizing the prognostic value of measurement Lohnes has been rather unfair to the grade system of assessment. There is basically nothing wrong with the grades. The difficulty lies in how they are used. Intra-individual comparisons and inter-individual comparisons are the two necessary corollaries of any scheme of measurement. What is to be avoided is to attach too much social value to grades. These are to be used as incentives in their own right rather than as prestige symbols. The objective of prognosis is being taken care of partially in schools. The lesson to be learnt from Lohnes address is and rightly so, that it should be given prominence in the teaching-learning process and used in a much more systematic manner duly backed by research than done so far.

The last paper of Session III and, incidentally, the last paper of the conference was a report on "Surveys undertaken by the Scottish Council of Research in Education" by David A. Walker of the Council. The first survey undertaken by the Council was the "1932 Mental Survey". This was conducted to determine the extent of "mental deficiency" in the school-going population. It was followed by "The Mecmeekan Survey (1935-1937)" to supplement the earlier survey. Miss Mecmeekan administered an individual test of intelligence to 873 children. Then followed the "1947 Scottish Mental Survey". The main point of inquiry was the relationship between the size of the family and test scores on a group test of intelligence which was found to be negative. The Scottish Scholastic Survey of 1953 was undertaken to provide national records of scholastic attainments. Tests of attainment in arithmetic and English were used for the purpose. After ten years another survey was made in 1963. This was a follow-up survey and indicated a definite gain in scores at all levels and in both the series. A study was undertaken in 1961-62 to standardize the Weschler Intelligence Scale for Children. The sample provided about 200 children in each age-group from 5 to 15. In 1962 the Council conducted a survey to determine measures likely to predict success in higher education. The data were being analysed at the time of report. A general observation about the hostility on the part of the government to external tests at the end of primary schooling is of interest and points to a developing trend even in some other countries as well

The Scottish Council for Educational Research is one of the oldest educational research institutions. It has done a lot of useful work in the field of educational surveys. A comprehensive survey to cover all the different developmental aspects of pupil growth has not been planned so far. Working in a small territory with a highly centralized educational administration it has never been difficult for the Council to collect whatever data they need. In such a favourable situation a long term project to make a multidimensional-cum-longitudinal study should not be difficult It would, on the other hand, provide valuable information on various aspects of pupil growth which have been similarly studied in some other countries.

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Social Psychological Research in Developing Countries

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This is a report on proceedings and papers presented at the international conference on Social Psychological Research in Developing Countries held at University of Ibadan, Nigeria, in January 1967. The conference aimed to encourage and promote research on the psychological aspects of social change and development, with special emphasis on deveolping countries, and to enhance the contributions of social psychology and related disciplines to such research endeavours through the development of patterns of research collaboration and coordination, research training and scientific communication based on international cooperation. The conference was attended by 54 participants from 24 countries, and 37 observers. The largest number of participants came from the U.S.A. There were 20 participants from seven African countries and four from four Asian countries. Udai Pareek represented India. Thus there was over-representation from the USA and very low representation from Asia, particularly from India. The articles included in the journal are divided into four sections. Part I contains five conceptual analyses of the potential of social psychology in dealing with problems of development. In one sense these papers set the stage for the empirical studies that follow in Part II and Part III.

Harbert Kelman, the conference Chairman, devotes the first half of his paper to the issues procedures and individuals involved in developing the conference. He discusses some of the major challenges facing social psychology if it is to make meaningful contributions in this area. Himmelstrand and Okediji on the basis of the conference discussions, present a model in which knowledge from social psychology may be organized to provide insights into the development process. Mundy-Kestle considers the problems of communication which create barriers for the successful introduction of social and technological development, and some cognitive differences between members of modernized and developing societies. Doab Dempleni and Collomb discuss some problems of orientation and conceptualization that concern social scientists working in this area.

Part II contains papers by Kiray Jezernik Pareek and Iacono. They address themselves to the second symposium of Motivational Aspects of Technological Development. Udai Pareek stresses the importance of societal system in producing specific patterns of motivation. He presents a general paradigm of social development in terms of concerns for excellence and for others in society. He emphasizes the need for motivation development programmes. Jezernik and Iacono discuss research in Yugoslavia and Italy respectively. They consider the effects of values on social changes and the reciprocal effects of changes on motivation and values. Kiray focuses on basic issues implicit in the three preceding papers and points to interdependence and mutual adjustment of individual needs and motivation and the social structure. Her analysis of two specific instances of social change in Turkey highlights a common thread in several papers that neither the social nor the individual factor can be adequately considered without reference to each other.

Part III is concerned with problems of education and the diffusion of knowledge with papers by Barbichon, Jahoda McQueen and Jalasurya. Barbichon discusses the problem of diffusion of knowledge, particularly the differences between scientific and technological information and the implications of these differences for the process of diffusion. Jahoda discusses some of the problems of research in education and socialization in developing countries. He is largely concerned with questions of the psychological capacities for absorbing information and education. Jezernik considers the opportunities within the social system for utilizing education, once it has been received. Jezernik discusses the problems of the increasing number of educated persons in Ceylon and their subsequent frustrations in seeking appropriate employment. McQueen reports his research on the school drop-out in Nigerian Society.

Part IV contains a record of the discussions in the working groups on the formal and informal issues raised at the conference. Kelman gives a brief introduction followed by three papers by Diazquerrero, Prince William and Fishman which summarize and synthesize the major problems and suggestions that emerges from these sessions. The working groups also prepared a recommendation which was considered at the final plenary session of the conference.

The conference suggested a proposal for low-cost cross-cultural research which was submitted by Donald Campbell. The paper considers some major methodological problems which plague studies done in more than one culture. Finally, M. B. Smith, one of the organizers of the conference, provides some concluding remarks. He highlights some of the problems of communication in cross-cultural conferences.

The Society for the Psychological Study of Social Issues had done a singular service to social scientists working in various countries, particularly in the developing countries, by bringing out such a well-edited and organized issue on the papers presented at the conference on social psychological research. The journal highlights the important role which social scientists can play in developing countries. We know from our experience the magnitude of social problems and issues which need the attention of the social scientists. The issues therefore will go a long way in providing the necessary material to social scientists in planning research, developmental and training programmes in their respective countries. Of particular interest to educators is the full section on Education and Information. The diffusion of knowledge is assuming a very important role in the content of rapidly developing scientific and technological research. Knowledge is essential for adoption of new practices which are pre-requisites for development. We know the time-lag between a theory or a new technique and its practice in all fields, including education. The conference has highlighted the important role of educators and those engaged in education in helping the acceleration of the process of the diffussion of knowledge as well as of the adoption behaviour.

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The Nature of Man and The Objectives of Education

The Symphony of Life

Donald Match Andrews. Unity Books. Lee's Summit, Missouri, 1966

The objective of education must in the last analysis be consistent with the objectives of life and the objectives of an individual's life must be in harmony with the objectives of humanity But than what is the objective of life; or, for that matter, we may translate the question into a more scientifically-looking one—what is life? Is it a dull dead matter? Or is it an heir to the spiritual throne? Toynbee suggests that we should attempt to put our secular super structure back on religious foundations. Religion is the serious business of the human race. Let us not forget, he says, the epitaph of the Roman Empire "Too late".

To get a clear idea about the nature and goals of life one has to look at life through the eyes of a scientist, a philosopher, and a saint. Can we simultaneously look at the life through all these angles?

The book under review is one such attempt. The author of this book is one of America's respected authorities in the field of chemistry. For more than a quarter of a century he was at Johns Hopkins University as Professor of Chemistry. He is now a distinguished Professor of Chemistry at Florida Atlantic University. With this background in science Dr Andrews considers the universe as composed not of matter but of music. It is better here to quote the very provoking but enlightening views of the author regarding the meaning of man.

The Meaning of Man

Does the meaning of man transcend time and space? Does your own personal meaning reach beyond space into infinity, beyond time into eternity. At this moment you are alive, you are perceiving, you are conscious, you are thinking, you possess identity. In all of this do you also possess a timeless core that carries your personal identity—conscious, perceiving, thinking, acting—past the limitations of mortality into a domain beyond distance and beyond duration? Does this personal, identical you contain a reality that is invariant under the transformation that transports it into the mansions of eternity?

Since the beginning of humanity itself, men have been trying to answer these questions. And from a host of the most penetrating thinkers that have ever lived, there comes a series of affirmative answers. One of the greatest of these is Whitehead's affirmation: "There is a freedom lying beyond circumstances, derived from the direct intuition that life can be grounded upon its absorption in what is changeless amid change." This freedom, that which is the essence of you, is truly an eternal verity.

The Eternal Verity of Man

As we have observed man in the perspective of the new basic concepts of chemistry and physics today, we have found that the ground of man's reality is to be sought not in the parts, not in the particles of which he is composed, but in his whole, total being. For we have found that the fundamental particles of nature as particles are in essence evanescent shadows. They transform back and forth from one kind to another kind in an iridescent kaleidoscope of form. It is a shifting pattern much like the transformation in a radio broadcast of the form of the symphony from the musician's brain waves to vibration in air, to electrical vibrations, to radio vibrations, to electrical vibrations, to air vibrations and back into brain waves. We cannot say that the symphony is the vibrations in air any more than it is the electrical vibrations, the radio vibrations, or the brain vibrations. In the same way, we cannot say that the essential reality of a particle is one form any more than it is any one of a number of other forms into which the particle can be transformed. So we conclude that the forms of the particles are but shifting shadows of a deeper, underlying, invariant verity. Thus the reality lies in the verity

As we ascend the ladder of form from those eternal verities of oneness, twoness, threeness, and their symmetries associated with the fundamental particle can be transformed. So we conclude that the forms of the particles and greater intricacy of form. We find complexities far beyond our capacity to comprehend or express in any mathematical or formal language today at our comand. But there is still every reason to believe that these atoms are again embodiments of forms that deserve the appellation of eternal verities. Going up another rung on the ladder to those molecular forms that are the coalescence of atoms we again find such clear and sharp identity of structure and function that we feel once more that we hold in our hands the embodiment of eternal verities.

Nowhere in this progression from the fundamental particles through the atoms up to the molecular level is there any reason for saying that at any particular point we have passed beyond the boundary of the eternal verities and are no longer dealing with total eternal forms but merely groups of parts. In the same way as we climb the ladder of complexity still farther through the macromolecules, the proteins, right up to the biological cell, we pass no barrier suggesting that the reality of eternal verity no longer attaches. In fact, when we see the unity of life, when we realize that the cell is the unit of structure of all living matter, we have an overwhelming reason for accepting the eternal verity present in the essence of the cell. When we combine the dynamism of particles, the dynamism of atoms, the dynamisms of molecules, the dynamism of macromolecules, the dynamism of cells all into the dynamism of total man, we again pass no border with a sign saying that "Here eternal veriety stops". Again, the very nature of the dynamism of man is an argument that we have been rising on this ladder of complexity through a continuous ascending order of eternal verities to arrive finally at the supreme pinnacle of the eternal verity in man. So it is logical to ask whether in this portrayal of man as a dynamic form of eternal verity we can see evidence of the dynamism of man's participation in eternity. In this frame of mind let us try to find answers to the questions regarding man's immortality.

As regards the universe he writes:

> that there is every reason to believe that every bit of matter (as matter) in this vast space is linked to every other bit of matter by gravity. There is every reason to believe that the de Broglie music of every portion of this space penetrates every other portion of it. So I ask you to consider the view of the universe in the perspective of a space of musical form with well vintillion dimensions. Then nearness or farness is not a question of space separation but a question of tuning.
>
> I am suggesting that in the perspective of this space of cosmic harmony where we see man's music mingled with the music of the entire universe, we can understand far more clearly the meaning of what Whitehead calls over mutual immanence with God. It is in this perspective that we get a clear vision of the unity of the universe. But in order to appreciate this incandescence of the universe in its full vitality we must now turn and reflect on its dynamism.

Albert Schweitzer and many others point out the necessity for a "theory of a universe". Today we see a theory of the universe emerging based on incontrovertible scientific evidence pointing to the fact that there is far more in the universe than can be accommodated within the confines of the commonsense concepts. To understand the structure and dynamism of the universe and man's place within it, we need to fuse the transcommonsense wisdom of the scientist with that of the Philosopher and of the Saint. In so doing we have to attempt to break the ramparts of space, ramparts of time and the ramparts of infinite. It is an astounding fact that scientific evidence from astronomical observation points to some kind of singularity in time that is approached when we go back in time about 10 billion years. Today we do not have sufficient evidence to depict with any certainty the dynamic structure of this singularity. We have even less evidence to support any conclusions about the future destiny of the universe. All we can do is observe the structure and especially the dynamism of what we see about us and within us, and extrapolate into the unknown. Again in this totality of form and its dynamism there is a radiance that lights the secret of the future and gives us faith that we move forward into an eternity of beauty and harmony and individual fulfilment. As Whitehead puts it, the universe is both transient and eternal. For those who are well versed in *advaita* philosophy there is much in the book under review which will supplement their basic approach.

For an educationist there is a big challenge now to infer the immediate and intermediate objectives from these ultimate objectives indicated by the *advaita* philosophy and the new discoveries in sciences Although while looking at the horizons he has not to forget the problem of helping a child how to take the next step, he has to be aware of these horizons so that he pursues the proper direction.

The book under review will go a long way in provoking an educationist thinker into the venture of relating the immediate objectives with the ultimate objectives of education. One can strongly recommend this book for all those thinkers who do not wish to lose themselves into the day-to-day activities but wish to keep themselves aware of the far-off horizons

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TEST

REVIEW

A Useful Intelligence Test

Verbal, Numerical and Abstract Reasoning Test

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The author of this test has taken the stand that general intelligence is the same as reasoning ability. Although 'reasoning' would be considered closely related to 'general intelligence' the two could not be taken as coinciding completely. So far, general intelligence has been considered broader enough to include comprehension, judgement and evaluation in addition to reasoning. Most tests of intelligence known to this reviewer, abroad or at home, have been constructed on a broader base than the one used in this test. Only a few amongst many names may be mentioned to support this: Terman-Merill, and Wechsler's among individual scales; Army Alpha, Otis's Tests and Tests from the Australian Council for Educational Research; as also group tests from Bureau of Psychology, Allahabad.

One cannot think of the battery as a comprehensive one for testing 'reasoning' either. Of course, part of the difficulty arises from the fact that in psychomatric literature 'reasoning' has been defined or described in as many ways as 'general intelligence'. Many smaller factors such as inductive reasoning, deductive reasoning, seeing relationships, etc. have been named under this broad heading. Guilford and others after carefully planned and step-by-step researches have come forward with a tentative definition of this ability in the following words: "General reasoning has something to do with comprehending or structuring problems of certain kinds in preparation for solving them". They also think that their test entitled "Ship Destination" is the best measure for it.

Lack of understanding of the nature of reasoning has been to some extent responsible for a very small number of tests constructed by this name. Among the few available are the Lowry-Lucier Reasoning Test Combination, Maddox Verbal Reasoning Test, Verbal Reasoning by Raymond J. Corsini and Richard Renck, and Reasoning Tests for higher levels of intelligence by C. W. Valentine. Of these the first one comes closest to Guilford's proposed definition. Maddox's test is no different than the verbal group tests of intelligence. Corsini's test measures logical reasoning and Valentine's measures inductive reasoning and symbolic logic. In India, some of the tests under this name are adaptations of subtests of DAT; only one such test in Hindi developed at the Department of Education, Gorakhpur University path, Gorakhpur, is available. It is restricted to inductive reasoning and when last reported, norms were not available. Tests in one of the three media, namely, verbal, numerical or figural, are available in different Indian languages, and sometimes in the same language adapted or standardized on different populations. The most comprehensive test seen so far is the Verbal Reasoning Test developed at the Indian Statistical Institute by K. N.

Sharma. The t[illegible] being in English, its use is highly restricted and is becoming more [illegible] every day. Considering this picture, the present test will take a useful place even if it could not be considered as measuring the total domain of reasoning—the totality of which is still not defined for universal acceptancy.

Regardless of what has been said so far, the present test is likely to prove as good a tool for prediction of success at academic work as any test of intelligence. This writer, however, is not convinced of the contribution of two subtests of abstract reasoning vis-a-vis the purpose mentioned above. The author has supported their inclusion partly on the argument that it is useful for testing children who do not know the language. At this level of school/college, the statement is not meaningful. It may, however, play some role in differential prediction. Empirical data are required to substantiate its usefulness for this as well as many other objectives towards which the test is directed.

The author has made too many claims regarding what is being tested through the two subtests on verbal reasoning; these include testing for foresight, abstraction, generalization, (understanding of) concepts, constructive thinking, planning, ability to solve logical problems, (to find out) complex relations among various things, events and persons. The content of the test does not support all this.

In the verbal section the sub-set on 'Classification' is good, especially keeping in mind that this particular format is very susceptible to retaining more than one type of classification justifiable, and thereby leaving more than one correct answer possible. The reviewer however, feels unhappy about Item 16 which is heavily loaded with a specific bit of knowledge. There is room for improvement in the sub-set on Analogy. Three out of the four practice questions need change/improvement. The analogies herein are loose and weak and sometimes also incorrect, as for example, in Practice Item 4 on Page 4. The author should also reconsider Item Nos. 5, 9 and 14 at the time of revision.

In Item 15 of the Number Series test more terms are needed to get the rule conveyed to the students. As it is, two possible rules, namely —2, +4, +4, and —2 X 2, +4 can be deduced permitting two possible correct answers.

In Abstract Reasoning, it has not been possible to maintain the size of figures used. So far so good; only this item should not then be used to differentiate a correct answer from a distractor as in Item 13 of sub-set V. In this very set the logic of the correct answer of Item 20 is not clear to this reader. Similarly the logic of the correct answer in Question 19 of sub-set 6 is not clear. The terms in the last item of the series, i.e., Item 20 are not sufficient to identify the correct answer. It could be both, 2, 2, 3, 3, 4, 4 or 2, 2, 3, 3, 3, 4, etc. One also fails to understand why seven dots are not used in the correct answer for Item 1 in here. Or is it only an error of the block maker which needs to be corrected?